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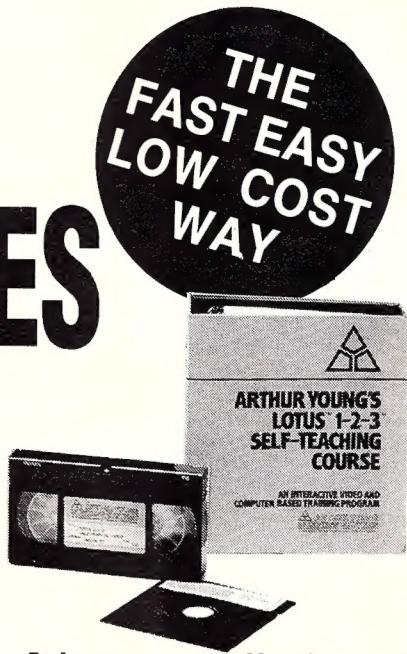
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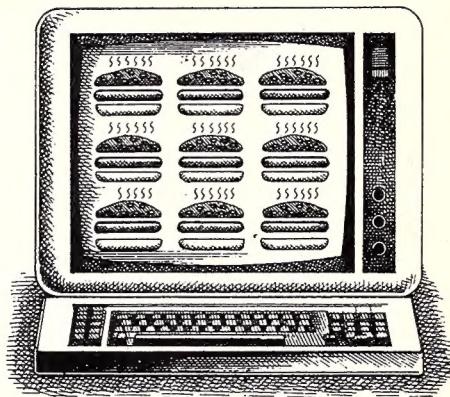
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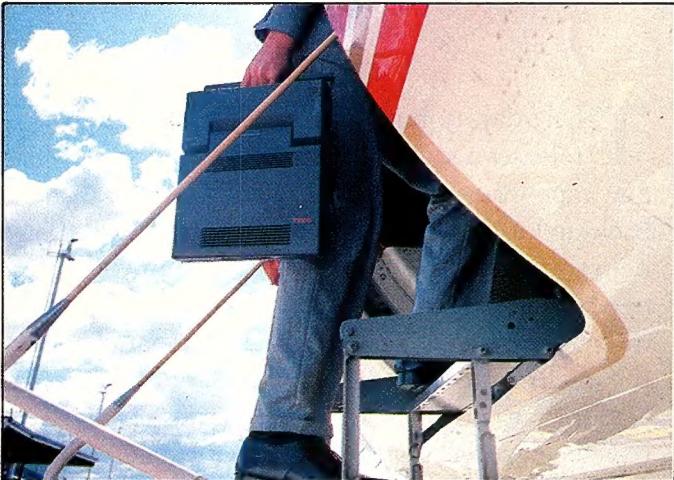
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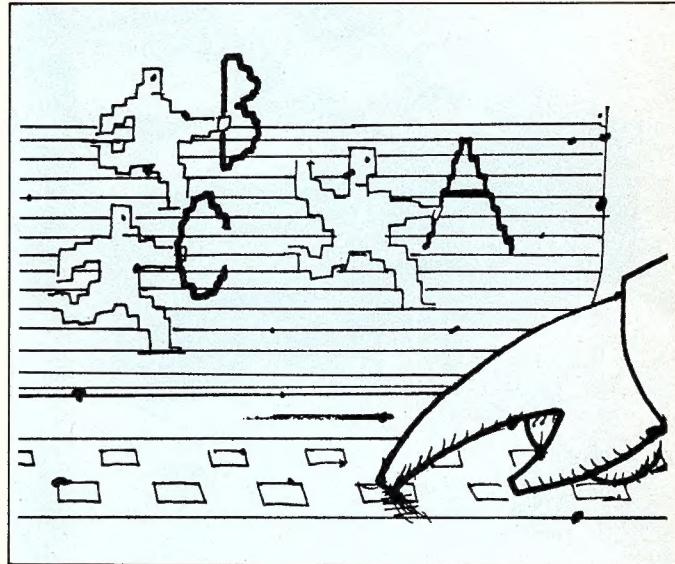
FEATURES

Lapping it up

In the same way the IBM 'legitimised' the personal computer as a serious business tool with the release of the PC in 1981, the new PC Convertible has renewed interest in laptop PCs among the corporate sector. Our team of experts examine the PC Convertible and its many rivals.



26

**Accelerated keystrokes**

The repeat-key action of the PC is slower than it could be but this can be simply rectified with software, as Dan Rollins explains.

63

DEPARTMENTS

From the editor's screen

This is a milestone issue of PC Australia for a number of reasons, including our first birthday and the arrival of our reader survey results. Ian Robinson summarises the findings.

PC News

This month's issue includes our biggest-ever PC News section, reflecting the growing amount of activity in the PC community.

9

Lassiter's brief

Just to make a change from all those Taiwanese, Japanese and US compatibles, Clive Lassiter examines a new AT-compatible from Ferranti, the British electronics giant.

11

Letters to PC

Ian Robinson selects letters and messages from PC Australia readers.

PC essay

How does the level of support provided for PC software stack up against that provided for other consumer goods, such as microwave ovens? Bill Fitzgerald recently had the opportunity to compare the two.

19

User-to-user

Stephen Murray returns to select the most interesting readers' comments, tips, hints and patches. Why not send him a letter describing your latest brilliant idea?

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Online help

A brand new column this month, from the technical support staff at Microsoft, answering queries about DOS, languages and windows.

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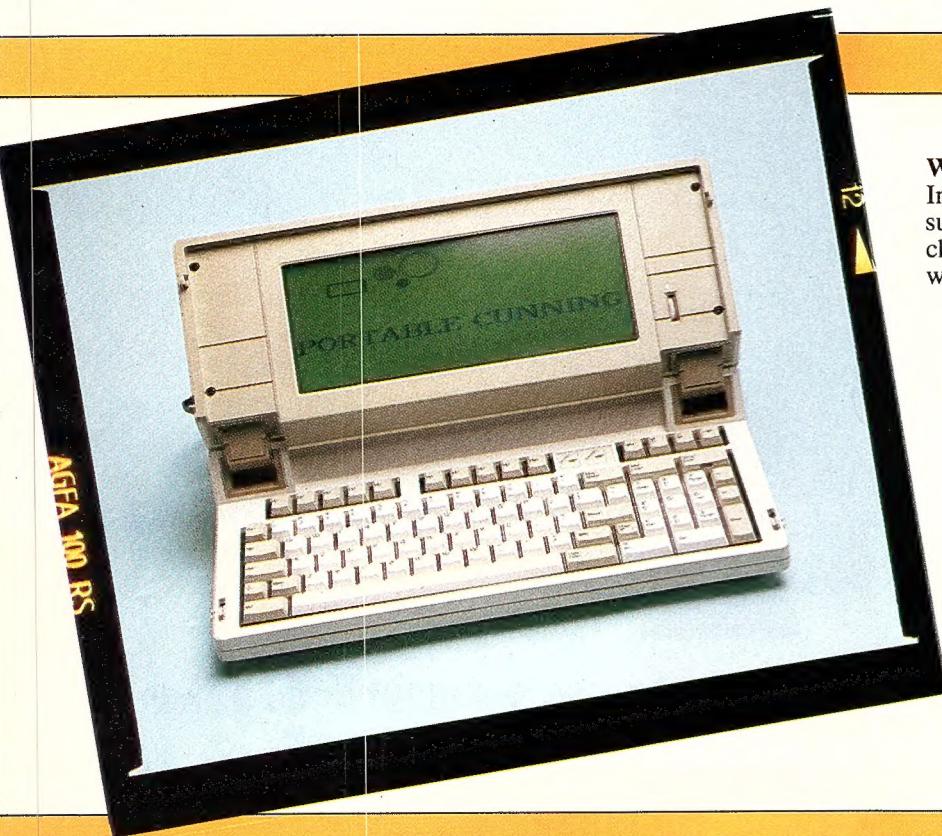
Tech notebook #22

One of your favorite columns, according to our recently-completed reader survey, is the PC Tech Notebook page. Don't miss this one!

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COVER: JOHN HAY



BBS file

PC Australia's dynamic dialler Robin Howells has found a new use for his modem — electronic shopping. This month he reports on the Oasis bulletin boards.

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New products

Margaret Macrae reports on the latest releases for your PC.

85

Spreadsheet clinic

If you would like to know more about the ins and outs of rows, columns, cells and worksheets, check out John Green's regular column.

89

The PC bulletin board

The PC community is alive and well, and the activities of all the user groups, BBS sysops and special interest groups can be found on these pages.

92

The Videotex page

Vi Adelle takes time out to relax, and describes some of the more innovative games now available on videotex systems.

95

Inside track

It seems that Microsoft is on the acquisition trail again, and John Dvorak speculates on what this could mean for the future of DOS, the universe and everything.

97

Coming up

Stay tuned for the November issue of PC Australia, which will feature, among other things, a review of Guru, the artificial intelligence package for the PC.

97

The Stein Way

What is the threat to the pulsating heart of PC capitalism? Must Lotus and Apple patrol the back alleys of Asia? Les Stein has his answer.

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NCR's MiniTower gives your PC the power of a mini computer!

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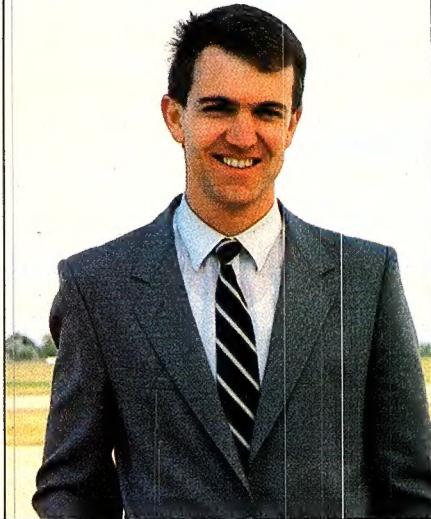
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Happy birthday



Welcome to a milestone issue of PC Australia, the interactive guide for users of the IBM PC and compatible systems, and the leading publication in its field in Australia.

Why is it a milestone? First, because it marks PC Australia's first anniversary, and as loyal readers who have been with us since last October can attest, the magazine has gone from strength to strength. Indeed, in the rough-and-tumble computer magazine market, many publications have not even come close to their first birthday.

A major reason for these failures is that a large number of technology-related publications have not understood the audience they are aiming at and could not respond appropriately to their needs. PC Australia, on the other hand, has always prided itself on being tuned into the requirements of the Australian PC community, as verified by our recent reader survey.

The PC Australia Reader Survey was sent out in the June 1986 issue and close to 4000 replies were received. From this invaluable feedback, we have gained important insights into

how to fine-tune PC Australia, and you are sure to notice indications of this taking shape over the next few months.

Like all surveys, the final results were in an impressive but bulky document, so I would be attempting the impossible in trying to cover the whole lot in a few paragraphs. Instead I will try to present a thumbnail sketch of our valued reader base.

While you may not be surprised that more than 98 per cent of PC Australia readers use a personal computer at work, you may be interested to know that more than 71 per cent of them also use a PC away from work. Although our readers spend an average 62.3 minutes reading each issue of PC Australia, they pass them around to friends and associates, as an average of 2.4 people read each issue. For those with any experience in magazine survey results, these are phenomenal readership statistics.

The most popular sections are PC News, New Products, Tech Notebook, User-to-User and — dare I admit it — the page you are reading now. The majority of readers strongly agreed that PC Australia provided pertinent information about PCs and was interestingly written. They enjoyed reading it and considered that time well spent.

Our advertisers will be pleased to know that three out of four PC Australia readers advised their company on the purchase of PCs and related equipment and a high proportion did not bother to look at any other monthly computer publications during the four months preceding the survey. (In fact, among all the other local computer publications, the most popular was the Australian's Tuesday computer pages, which 28 per cent of respondents read regularly.)

As for our readers themselves, 95 per cent are male, and more than half of these possess a degree, diploma or

certificate, while 26 per cent have postgraduate qualifications. A significant 84 per cent of readers earned more than \$25,000 per annum, including 36 per cent who earned \$40,000 or more a year (before tax). As for their age group, the majority of readers are aged 25 years or over, with the two key groups being those aged 25-34 (33 per cent) and 35-49 (50 per cent).

PC Australia readers appear to be spread fairly well, geographically speaking, with 31 per cent in Victoria and 32 per cent in New South Wales, while the remainder are scattered across the other States, along with quite a few from New Zealand, Papua-New Guinea and other countries (including a number in the US). A quick scan through the Letters to PC pages in the past few issues will verify the diversity of our readership.

So there it is. If these statistics sound different to your own situation, remember that they are average results. Nevertheless, they are fairly accurate averages, because of the large response to the survey.

Getting back to the fact that it is our birthday, and tying in with this issue's theme of laptop PCs, we have organised a special birthday present in the form of a Chendai Lap PC, to be awarded to a randomly-selected PC Australia subscriber. The details can be found on the subscription card insert, and the opportunity will be repeated in the next issue.

Another milestone with this issue is the fact that PC Australia will now be available — in strictly limited quantities — on selected news-stands around the country. This is initially being done on an experimental basis, to meet some of the overwhelming demand for each issue. If it proves successful, we will look at continuing this alternative distribution method, although PC Australia will always be predominantly targeted at our loyal band of subscribers. ■

Ian Robinson can be heard on 3AW's Computer Cafe program each Thursday night from 8.30 to 9.00

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News

Toshiba laps the competition

Following its success with the PC-compatible T1100 laptop, introduced a year ago, Toshiba (Australia) Pty Ltd has released two new models, the T2100 and T3100. However, there has so far been no indication of a local release date for the improved T1100 Plus, which has already made its debut in the US.

The mid-range T2100 sells for \$4250 with 3.5inch floppy disk drives and \$6500 for a 10M hard disk version. The 8MHz 80286-based T3100 with 640 by 400 pixel gas plasma display and 10M hard disk sells for \$8500. Serial and parallel ports, realtime clock/calendar and external RGB screen port are standard on both models. A 20M hard disk version of the T3100 is planned before the end of the year.



Toshiba's TC 3100: A 20M hard disk is planned by December

Orchid's growth accelerates

Porchester Computers, local distributor for the Orchid Technology range of IBM PC expansion hardware, has announced the local availability of three new accelerator boards — the PCturbo 286e, TinyTurbo 286 and the TurboEGA.

The PCturbo 286e, claimed to be the fastest accelerator board on the market, uses its onboard 80286 processor to run DOS while the original PC 8088 chip handles 1/0 functions. The board runs at 8MHz, includes a socket for an optional 80287 numeric coprocessor and comes fitted with 1M of RAM, with an option to expand this with another 1M of EMS RAM. The TinyTurbo 286, while not quite as fast, takes up a 'short slot' in a PC XT or compatible and upgrades a system with its 80286 processor.

Orchid Technology's TurboEGA combines a 7.2MHz 8086 accelerator board with a display adaptor compatible with IBM's Enhanced Graphics

Adapter, the Hercules board, and standard color or monochrome displays. Bundled with the TurboEGA is a copy of Microsoft Windows, which really requires both a high-speed 8086 and EGA standard graphics to do it justice.

Licences on offer

MultiSoft, the Australian distributor of GRAPHTIME II, has announced the availability of site licences for this new business graphics/drawing system for IBM and compatible PCs.

GRAPHTIME II is suitable for rapid production of lecture aids, such as overhead foils and color slides of business/statistical graphs, diagrams and text in multiple fonts and colors. Minimum system specifications are 256K of memory and a color graphics card. Single licences are \$99, and site licences allowing 20 copies cost \$399.

Myth turns to reality

Speculation about a proposed addition to the IBM PC family (often nicknamed the 'PC-2') has been laid to rest by the surprise release of IBM's XT-286, the most powerful XT model.

The PC XT Model 286 incorporates an 80286 CPU and comes standard with 640K RAM, a half-height 1.2M disk drive, 20M hard disk, parallel/serial adapter card and the new IBM Enhanced PC Keyboard. It is priced at \$US3995.

IBM also released the SYTOS Tape Utilities for hard disk backup and announced that standard memory sizes for its existing 20M XT models would be increased to 640K with no increase in price.

TOP TEN



1. 1-2-3	— Lotus Development Corp.
2. Multimate	— Ashton-Tate
3. dBase III Plus	— Ashton-Tate
4. Word 3.0	— Microsoft
5. DisplayWrite III	— IBM
6. Dataflex	— Data Access Corp.
7. WordPerfect	— SSI Software
8. Enable	— The Software Group
9. WordStar	— Micropro
10. Open Access II	— Software Publishing Inter.

These figures are for July and differ from June in two ways — the return of Multimate to the number two position and the return of Enable. Ashton-Tate has overcome its supply problems helping the package to outsell its nearest rival, Word, by 200 units.

Word processing packages again account for one third of software sales. The overall figures for July — like June — are 10 per cent down on those for the previous month.

The PC Australia Top Ten is derived from monthly surveys of more than 240 PC software outlets by Compass Research.

Philips takes a blue direction

During August, Philips introduced two new IBM compatible PCs and a range of peripherals, reflecting its belief that besides acting as a business productivity tool, the PC will develop as an intelligent workstation for office automation and other integrated systems, such as banking.

At the top end of the new PC range is the P3200, a powerful AT compatible. According to Philips, it is ideal for the professional user who requires high performance, large storage capacity and rapid communications with other computers and business systems.

The P3200 is based on the Intel 80286 microprocessor and is available in two versions; a 1.2M formatted high density floppy disk drive model and a 25M hard disk model.

Eight expansion slots are available (two XT and six

XT/AT). One of the XT slots is standard and is equipped with a single serial/parallel multi-function expansion board, providing numerous communications capabilities including an RS232 (v24) interface. The unit is supplied with a 12-inch high resolution monochrome monitor. Two video boards are available, offering resolutions of 640 x 200, or 720 x 348 pixels. A 13-inch color monitor is an optional extra. The PC runs MS-DOS and supports GEM and WINDOWS.

The P3102 is based on the Intel 8088 microprocessor. This PC has extra functionality in terms of graphics and connectivity and can be used as a stand-alone or as an integrated intelligent workstation.

The P3102 also comes in two models and both have 512K standard memory (expandable to 640K). The floppy disk drive



CD-ROM: holds information in digital form.

version is formatted to 360K while the hard disk version can have a 10M or 20M capacity.

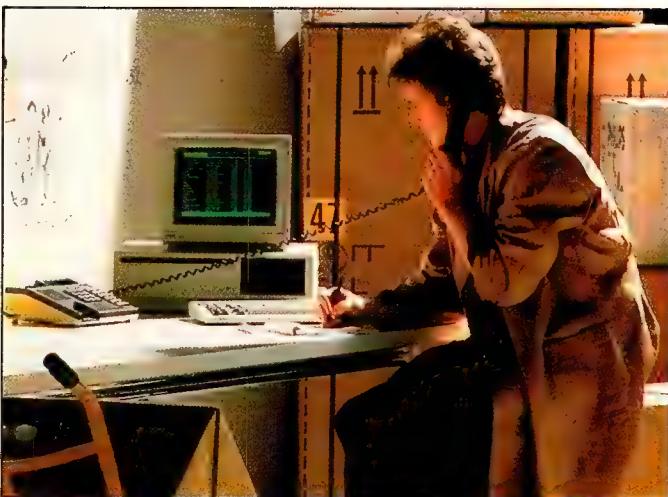
The P3102's 12-inch monochrome monitor, with its 640 x 400 pixel display, is switchable to 640 x 200 to display certain IBM software. Through an emulation mode, off-the-shelf color option packages can be displayed on the monochrome screen. This unit also runs MS-DOS 3.1 and comes supplied with GW-BASIC and a PC tutoring package for self-instruction.

Philips also launched peripherals, aimed to extend the range of PC applications, through a company devised concept called PC Plus.

In PC Plus, the role of the PC is to act as the user interface, the access medium, the controller and the display. Attached to, or integrated with it are peripherals that can be connected to the new PC models.

The CD-ROM (Compact Disk — Read Only Memory) holds information in digital form, enabling the PC to see the CD-ROM data on the disk as normal extra directories under MS-DOS. One compact disk has a 640M capacity, or the equivalent of 220,000 pages of text, or several thousand images.

The Smart Card was initially developed for electronic funds transfer at point-of-sale (EFT-POS) and retail banking applications, but connected to a PC, it allows the computer to act as a corporate banking terminal. Through the RS232C serial interface, the PC can be connected to the LaserVision video disk. The result is an interactive training and sales aid. The PC can send instructions to, and receive information from, the LaserVision player.



The P3102: extra functionality in terms of graphics.

Keycorp keyboard

A new computer keyboard has been released by Keycorp, an Australian-owned computer company. The keyboard was invented and developed by 22-year-old, John Wood, a student from Newcastle.

His "operator friendly", "intelligent" invention enables unskilled people to operate complicated computer software packages. Using a sophisticated set of self-identifying keys, the operator is lead through the

maze of keystrokes necessary to instruct the computer.

Keycorp, which finalised the development of the product and arranged for its manufacture and marketing, believes there are many benefits to the industry. It emphasises the elimination of training time, faster operating procedures, flexibility of personnel involvement and the elimination of

fear of computers.

The Federal Minister for Science and Technology, Barry Jones, who officially launched the keyboard praised it and Wood. It has been accepted as an approved product for government departments under the Federal Government's annual equipment tender.

Keycorp also hopes to export the keyboard.

NEC mounts AT challenge

NEC claims its latest PC, the IBM AT compatible APC IV, will pose the first real threat to IBM's strong hold on the corporate and departmental PC marketplace.

Daniel Petre, NEC's information systems' marketing operations manager, said, at the machine's mid-August launch, that NEC is relying on the APC IV's better graphics, networking capabilities, faster processing speed and greater disk and memory capacity to win a share of the high-end market.

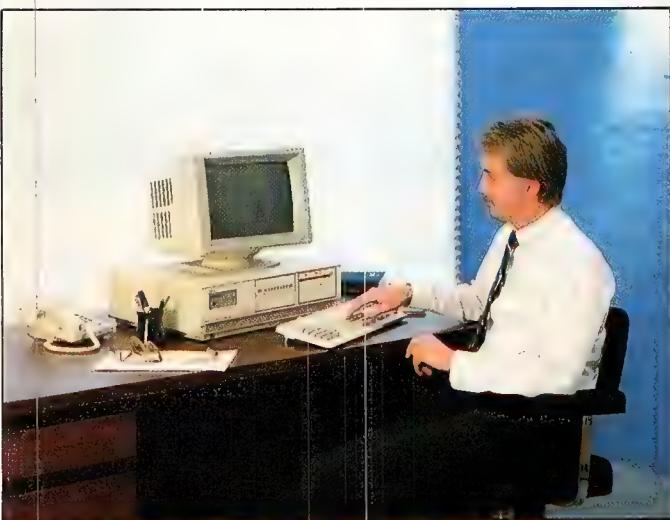
According to Petre, the APC IV was not designed to replace the APC III, but to enhance NEC's product range and provide the company with a powerful, aggressively priced PC as a stepping stone into the corporate sector. The APC IV's basic configuration is a 40M

hard disk, 640K RAM, a 1.2M/720K floppy disk drive, a color graphics card and an advanced color graphics display.

The machine offers an "open style" architecture ensuring compatibility with existing MS-DOS software. AT-class software can be installed in the machine with no modifications. IBM AT, Xenix and Pick operating systems software can also run on the APC IV.

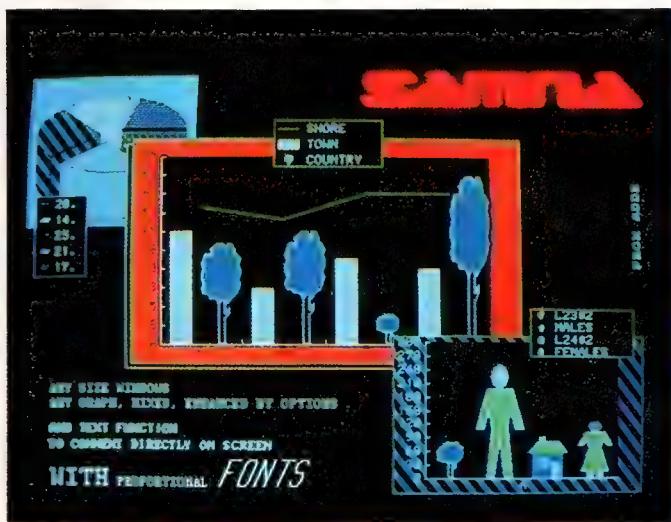
The advanced graphics display and card are fully compatible with the IBM EGA and CGA graphics adaptors and provide 640×350 pixel resolution. An optional power graphics monitor of 1120×750 pixel resolution and power graphics board offer almost limitless color possibilities from a palette of 4096 colors.

The APC IV will cost \$9935.



The APC IV: Includes five full expansion slots.

Samna moves from words to pictures



Samna Corporation, which developed the powerhouse word processing package Samna Word III, has released Samna Decision Graphics a software package for the IBM PC and compatibles.

Originally developed by Paris-based company ADDE Marketing, Samna Decision Graphics allows users to create a variety of graphs from numeric and statistical data and includes extensive calculation and macro capabilities. The software can generate graphs from keyboard entry data or from a multitude of external file formats.

More than 375 different types of graph are possible,

drawing on a range of 15 graph 'families', including lines, points, steps, bars, pies, pyramids, scatter, numeric tables, icons and combinations of these. Displays may be 3-D or flat, overlapping or superimposed, with or without grids, titles or values shown.

IPEC Hi-Tech Express

IPEC has launched a Hi-Tech Express Division aimed at high technology equipment manufacturers, suppliers and computer industry people who want to move equipment.

IPEC has invested heavily in specialised equipment and highly trained staff to operate the new division. It offers two levels of service, normal and Rite on Site, and three modes of delivery — same day express, air express and road express.

Normal delivery is door-to-door pick up and delivery service for pre-packed consignments. The Rite on Site is a complete packing, handling, delivery and installation service.

More RT releases from IBM

As part of its ongoing barrage of new product releases, IBM has announced comprehensive networking, communications and graphics enhancements for the RT PC, making it a more viable engineering workstation. In addition to token ring, SNA and PC communications capabilities, the RT will be able

to operate over an Ethernet LAN, which is one of the most widely-used networks in scientific environments.

Unlike Ethernet, there are no RT applications which can run on the new token ring adaptor, but IBM is keen to push developments in this area. The new AIX 1.1 upgrade to the

RT's Unix-like operating system provides enhanced graphics-processing features and supports Ethernet connections. It will also support two new high-resolution displays introduced by IBM, which provide for 720 by 512 pixels in 16 colors and 1024 by 768 pixels in monochrome.



*Inside every PC there's a
faster, more powerful one
trying to get out*

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FlashPak gives your PC new power and speed. Now you can zip through calculations and spreadsheets up to 3 times faster than before. Easy to install and competitively priced, FlashPak utilizes the powerful NEC V30 microprocessor, which is fully compatible with Intel's® 8086. But faster.

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as any other off-the-shelf software. And FlashPak accelerates your paging and recalculation by up to three times.

FlashPak includes an advanced, 8KB dual cache architecture that maximizes program acceleration potential. It is simple to install, takes an 8087 coprocessor for math-intensive applications, and can be switched to 8088 (normal) mode for games and other timing-sensitive software.

FlashPak is just one of the range of high quality PC enhancement products from AST – the world's leading peripherals developer – and all are available from Imagineering.

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New Sperry offerings

Sperry has strengthened its position in the local and overseas PC markets by releasing a range of new products, including a compact 80286-based system, laser printer, high-capacity disk drives and enhanced graphics capability.

Like IBM's XT-286, the Sperry PC/microIT is intended to bridge the gap between high-end personal computing and small multi-user systems. With an 80286 processor and selectable clock speeds (6, 7.16 or 8MHz), the PC/microIT uses VLSI and surface-mount technology to reduce its desk

footprint to 38cm by 38cm. Standard features include 512K RAM (expandable to 1.5M onboard), serial and parallel ports, battery-backed clock/calendar, onboard disk drive controller and five expansion slots.

The Sperry Model 37 laser printer contains 61 resident fonts and will produce 10 pages a minute, while the Sperry enhanced graphics adaptor is based on the popular C&T chip set used by most third party EGA board manufacturers. Sperry intends to begin assembly soon at its Queensland factory.



Sperry's PC/microIT (left) and its big brother, the PC/IT.

Conjuring up color



A sample of Conjure Systems work printed on a Tektronix 4692

The Conjure 2-D graphics system for IBM PC ATs and compatibles has been announced by Australian company Vision Control International. Conjure incorporates a high-resolution monitor and controller card, with a digitiser and appropriate software and can be optionally interfaced to video cameras, color inkjet printers, film and video recorders and other graphic output devices.

Conjure can output in high-resolution graphics (512 by 484 pixels) or in PAL format (768 by 576) with a palette of 16.7

million colors and can capture and edit video or film images. Pre-drawn shape libraries are available, as is a wide range of text fonts and sizes. The digitiser pad layout can be customised and stored in an environment file.

Vision Control is targeting the system at the smaller advertising agencies and graphic design centres. The price tag is around \$25,000 to \$30,000 compared to existing mainframe and minicomputer-based systems costing hundreds of thousands of dollars.

Digital bridges the gap

Digital Equipment Corp has released VAXmate — the company's first system to be fully compatible with the IBM PC AT — which is designed specifically for networked office environments.

The VAXmate is convection-cooled and includes all of the circuitry within the monitor unit. A single disk drive on the right hand side of the screen is compatible with the AT's 1.2M drives and hardware compatibility is provided by an optional expansion box — which plugs in beneath the VAXmate.

VAXmate, with its inbuilt DECnet/Thinwire Ethernet local area network support, can transmit and receive information at up to 10M a second, using a VAX or MicroVAX as a central file server. MS-DOS 3.1 and Microsoft Windows are included with the VAXmate, and so is a three-button mouse. A 2400 baud internal modem is pending Telecom approval.

Announced with the VAXmate was PC All-In-One, a MicroVAX server system allowing up to 30 PCs to be linked.



Digital's VAXmate networked PC is put through its paces.

MIRAGE moves to Perth

MIRAGE, the popular US graphics software package, by Zenographics, is being sold and supported now by Western Australian software house, Super Software.

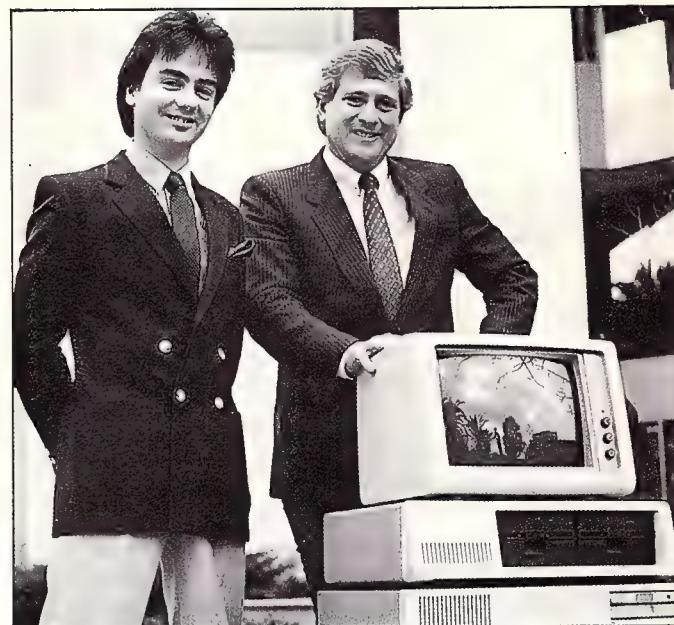
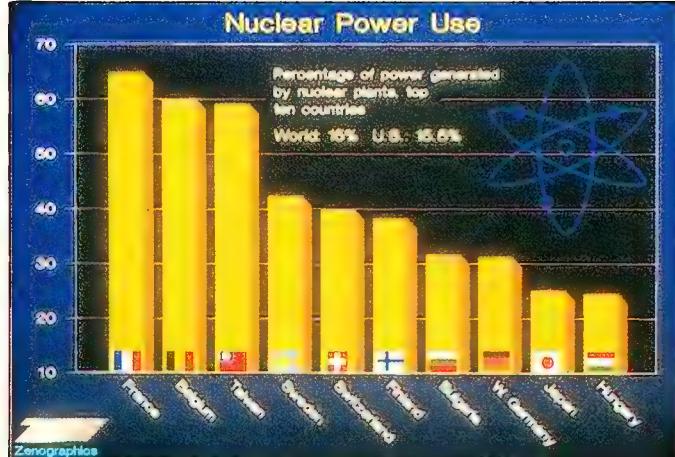
Major improvements in Version 5 include a new color control allowing 360 million colors, and color 'sweeps' (gradually changing color across an area.) Monochrome grey shades are much enhanced and new text fonts allow publication quality graphics on laser printers. The new version also has improved device handling, allowing, for example, 100 colors on an IBM Enhanced Graphics Adapter.

MIRAGE is directed at companies which need to produce good graphics all the time for audio-visual presentations and

report generation. The software runs on an IBM PC, XT, AT or compatible. Graphics can be output to a film recorder, laser printer, thermal ink printer, ink jet printer, pen plotter or electrostatic plotter.

MIRAGE can take data straight from most popular spreadsheet programs. There are eight font styles and no limit on font sizes. Axes can be at any angle, and the system has built-in numeric, date, month and log axes. Images can be moved around the screen easily, enlarged, reduced, and stored for later use. Resolution is 32K x 32K pixels.

Graphics created on the system can be stored on disk for later use. MIRAGE ranges in price from \$1600 to \$3000.



Rod Cuthbert (Select Microsystems) and Graeme Smith (IBM): the System 36/PC offers new flexibility for PC users.

New class of dealer

IBM have created a new PC dealer classification, called Advanced Function Dealer, for retailers with the capacity to sell and support the IBM System/36 PC. A limited number of dealers with the staff and industry background to support the System/36 PC have been appointed throughout Australia.

They are Select Microsystems, Melbourne; Craft, Hall and Edwards Melbourne; Data #3, Brisbane; Parity, Sydney;

The Computer Group, Hornsby and Dubbo, NSW; Oasys, Parramatta, NSW; Computerland, Burwood and Ryde, NSW; Management Technology, Hobart and Launceston and the Business Equipment Centre, Adelaide.

According to Select Microsystems, the System/36 PC provides new flexibility for existing PC users with 80M of disk storage accessible by attached PCs or terminals.

Mobility for PCs

The South Australian-based computer company, Australian Executive Sales, has won a contract to export 150 of its new micro-shuttles to the US.

The AES Micro-Shuttle is a South Australian designed and built mobile computer workstation. The ergonomically-designed unit (right), eliminates the need for a desk, uses about three-quarters of the space normally reserved for one and can be easily moved around the office.

The company has more than 3000 units in use in government, educational and commercial sites in Australia.

A company-sponsored survey in California suggests the US market potential for the micro-shuttle will be about \$40 million a year. AES intends to begin test marketing along the US West Coast through BHP Trading of Los Angeles.

The basic unit is available in Australia for \$536. Accessories are also available.





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- Spectrum graphics card compatible
- 4 layers

NETWORK CARD

- No dedicated file server
- Floppy disk sharing
- Transparent to DOS
- Trans-Net Spool (Printer Files Spooling)
- Enhanced networking DOS command

PC SPEED

- SPEED CARD
- Increases IBM PC speed by over 200%
- Ultra-fast 10MHz 8086
- Simple plug-in installation
- Compatible with existing software; Lotus 1-2-3, Wordstar, dBASE III, etc.

SHORT — EGA CT — 8090

- 100% Hardware and software compatible to IBM EGA card
- Supports IBM CGA + MDA
- Bit mapped in 4 planes
- 640 x 350 res in EGA mode
- 640 x 200 + 320 x 200 in 16 cols for CGA, 720 x 350 for Monochrome display
- Soft scrolls, pans and windows through a 1-mpixel memory.
- Supports 256K of memory using 64K x 4 drams.

DEC — VT 220 TERMINAL CARD

- Full VT 220 Emulation
- Parallel/Serial Printer Selectable
- Monochrome TTL or Composite Video Monitor Selectable
- File Transfer: Upload/Download

SPEED + TURBO — 286

- Increases PC speed by 900%
- 8MHz 80286 Processor
- Socket for 80287
- IBM RAM installed
- Expandable 2MB on board
- Software selectable 8088 or 80286 operation
- Runs all popular programs

ZAP

- Speeds up disk I/O access
- Disk I/O intensive progs like dBASE II will run 2-4 times faster
- Easy to install
- Safer than RAMDISK

GRAFX-PRO +

- Fully IBM EGA compatible
- Full 256 RAM screen buffer on board
- 640 x 350 res in 16 colours
- Extra printer port

MULTI DISPLAY CARD

- 132 COL x 25/44 lines text mode
- Software control display mode
- Hardware control color mode or monochrome
- Nonflicker display
- Compatible with IBM color adapter & Hercules graphic card
- 132 column can use for word star, Lotus 1-2-3 in monochrome text-mode

X — RAM — 2

- Lotus/Intel above board compatible
- Extra ram may be divided between conventional and EMS RAM
- Fully populated with 2MB RAM
- RAM disk
- Disk cache
- Printer buffer

1.2MB FLOPPY CONTROLLER

For IBM-PC/XT or PC/AT will read/write 360KB or 1.2MB disks in drive

MINI - AT MOTHERBOARD

- Replace your PC/XT M/B & upgrade to PC/AT
- Fits existing mounting
- 6/8MHz operation

INSTRUMENTATION/ CONTROL

- Full range of cards
- A/D, D/A
- Optical input
- Relay output
- High speed A/D
- JTR thermocouple, etc

XT SPEED — DIGIS — 286

- Increases PC Speed by 600%
- 8 MHz 80286 Processor
- Sockets for 8088 and 80287
- Hardware selectable 8088/80286 Operation
- 8K Local Cache Ram
- Takes Up Only Half Slot
- Fully DMA Compatible.

MONOCHROME/GRAFIC/ PRINTER CARD

- 80 x 25 OR 132 x 25/44 mode
- 64K bytes graphic ram
- 720 x 348 Graphic mode
- Can directly run Lotus 1-2-3, Autocad, Framework, Symphony
- No scrolling noise
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- Software L basic (mono/graphic)
- Software mode change

STOP PRESS

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TWICE AS FAST AS THE "AT",
AT LESS THAN HALF THE PRICE

Specification:

- ★ MOTHERBOARD: 100% compatible bus and form compatible CPU board
- ★ MICROPROCESSOR 10MHz 80286-8 16/24 CPU
- ★ MEMORY: Expandable on-board to 1M-bytes
- ★ DISPLAY: Color Graphics or Monochrome, also optional Enhanced Graphics Adapter or 132 Column cards
- ★ I/O PORTS: 4 x RS232 Serial and 1 x Centronics Parallel on board.

★ EXPANSION SLOTS: 8 I/O slots, 2 x single 62 pin, 6 x dual 62 pin and 36 pin

★ POWER: a large 200 Watt power supply standard

★ OPERATING SYSTEMS: DOS 3.0, 3.1, and Xenix

★ LANGUAGES: Basic, Fortran, Cobol, APL, Pascal, Macro, Assembler

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YEAR WARRANTY

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— The Small System With The Big Performance But Small Price Tag.

★ XT size unit with full AT specifications.

★ 10MHz 80286 processors with 80287 support.

★ Fits all standard PC/AT Cards.

★ Fully 100% software and hardware compatible with IBM PC/AT (But twice as fast).

★ 1 Meg memory on board.

★ Suitable 6/10 MHZ operation.

★ 4 Layer motherboard, 5 custom chips.



South Seas Shipping Company

November 20, 1988

Ms. Cathy Lyons
Import Officer
Botanical Research Ltd.
55 Wewak Road
Moresby, Papua, New Guinea

Re: Palm Fruit Research

Dear Ms. Lyons:

This letter confirms the agreement we reached at our meeting last week in San Francisco.

Botanical Research, Ltd. will recommend the optimal conditions for shipping palm fruit and palm oil. Most important issues for consideration are: temperature during shipping and length of time between shipping.

To be completed by June 1, 1989.

South Seas Shipping Company
Corporate Organizational Chart



INVESTOR'S UPDATE

APRIL 1, 1989

SOUTH SEAS SHIPPING COMPANY NEWSLETTER

SHIPPING GOES WILD IN THE SOUTH PACIFIC

BY SUZANNE FARRAND
DIRECTOR OF SALES

South Seas is causing a stir in the shipping world, usually every other week. The company, South Seas, is trying to maintain its growth, despite the strong dollar and lower-than-ever freight rates. For the first quarter ending on March 31, South Seas turned in a record \$20 million profit on sales of \$117.1 million. President Trevor Cardinal cited several reasons for this record-breaking quarter. First of all, by expanding operations into specialized, price insensitive commodities like palm oil and rum, South Seas has been relatively unaffected by the strong dollar and unfavorable exchange rates.

Second, South Seas is now reaping the benefits of long-term relationships it has developed with port authorities throughout the South Pacific. These relationships have let South Seas keep its rates competitive, yet profitable, during recent freight rate wars.

Finally, Mr. Cardinal said South Seas had money left over from funds it set aside last year for costs associated with the building and launching of new container ships.

Outlook for Sales

Spectacular sales for the first quarter will set the pace for what industry analysts expect will be a record year for South Seas. "South Seas will be the industry leader by 1990," says Michael Wong, a vice-president at Donovan, Kroll & Co. "Their growth strategy is sound and their balance sheet gives them the financial muscle to continue to grow even during the current slump in the shipping industry."

Competitive Factors

One of the primary factors in South Seas' success has been its company's ability to identify the market opportunities and then to establish the dominant position in that market. The palm oil trade is a prime example of this successful strategy. Since entering the market in 1977, South Seas has become the key player in the specialty shipping market.

However, LBC Ltd. is expected to become a more aggressive player. The Singapore concern had concentrated its efforts on short-haul container freight in the Indian Ocean. Last year, LBC purchased the ailing Barton Lines. This purchase more than doubled LBC's tanker capacity. Several of these mid-sized tankers have been refitted for the palm oil trade and are expected to enter service by mid-1989.

So far, the LBC has been unsuccessful in winning any of South Seas' customers. In the future, increased competition will be expected to depress both prices and margins, but for the short-term, South Seas contracts with most of the palm oil industries largest producers should insulate it.

SHARE OF PALM OIL TRADE (1985) DOLLAR VOLUME

SOUTH SEAS	64%
MORESBY EXPORTS	18%
LBC LTD.	16%
ALL OTHERS	4%

JOB INVOICE

DATE: 04/15/88

INVOICE NO: 8210

SSS-COB NO: 2168

CODE: AMOUNT:
S10,287.50

TH SEAS SHIPPING COMPANY
THI SALES TRANSACTIONS
BY CUSTOMER

Ltd.	Representative No:	54
Ext. Price	Cost	Ext. c.
77,000.00	\$3,530.00	\$2,000.00
3,750.00		
000.00		
000.00		

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HP LaserJet

hp HEWLETT
PACKARD
Business Computing Systems

A gentleman's machine

How about this — a desktop PC with the appeal and panache of a British gentleman's quality motor car? Ferranti's latest AT clone — the PC2860-AT — smacks of class, breeding, attention to detail and raw power when you need it. With overdrive available from the keyboard, the PC2860 idles its 80286 processor at a modest 6MHz or revs up to 8MHz. Its top speed runs close to the President AT (PC Australia, August, 1986).

The chassis is, in a word, classy. I understand that the bodywork design is Italian. Most appropriate. Getting under the bonnet (not that a gentleman really needs to) is elementary. No tools required; just a tug and a small top panel is lifted to reveal six expansion slots, two of which are short 8-bit IBM PC compatible (one used by the video controller). A long (AT style) slot belongs to the disk controller and logic for serial and parallel ports is on the motherboard. The serial port uses the increasingly popular nine-pin socket in favor of the standard 25-pin D-shell arrangement.

The elegant radiator grill (sorry — front panel) has LED indicators for power and hard disk access. There is no IBM-style security lock. With its standard 20M NEC hard disk, it is less likely that there will be considerable demand for multiple user applications. That is not to say that the machine is inappropriate for LAN usage. A single half height 1.2M floppy disk drive sits beneath a knockout panel, available should you wish to add another half height drive. The power switch is in the traditional (IBM) side location and there is a switched outlet on the rear for monitor power. An externally available slide switch allows the selection of either 115 or 230V power sources.

This AT is no small sports model. Measuring 53cm wide by 46cm deep and 15cm high, the unit weighs 16 kilograms. Machines this size are probably best located vertically in a floor mount. The only disadvantage with this arrangement is that the



Ferranti PC2860-AT: runs a broad spectrum of popular packages

monitor is then a little low for comfort. The review unit monitor (a Taxan Super Vision IV) was minus a tilt-and-swivel stand. At the retail price of \$6250 the unit is supplied with a high resolution green or amber monochrome monitor plus a color graphics card. Ferranti recommends either the ADI DM14 monochrome or the Microvitec BM 1456 high resolution RGB monitor. I found the Taxan very easy to use and it will be hard going back to the regular CGA on my own PC.

The 300W power supply is more than ample for any conceivable expansion needs. There is clear evidence of attention to detail in the internal construction and the motherboard circuitry is well laid out, albeit with a degree of British conservatism. There is 640K of RAM installed, although I could not find any empty sockets suggesting that onboard

expansion to a megabyte was possible. Two lithium rechargeable cells maintain system time and date.

No surprises with the keyboard which features a long connection coil and adjustable rake. There is no keyclick. One has to get used to the feel which is a bit spongy, but there is a positive tactile feedback from two separate spring forces. The three indicator LEDs are on the keys themselves and the enter and shift keys are of a size a professional typist would approve.

Our standard benchmarks proved the Ferranti to be among the top performers in the AT speed trials. Note that the CPU-bound tests do not make use of the optional 80287 numeric coprocessor. The performance of the hard disk compares favorably with similar machines using fast access voice coil technology.

Switching speeds is done from the

keyboard and the color of the power LED indicates your speed; red for 6MHz, green for 8MHz. The machine boots up in the 6MHz state (8MHz would have been a better choice). The key sequence Alt 8 selects 8MHz, while Ctrl-Alt-6 gives you 6MHz. I found the choice a little awkward since SideKick wanted to be part of the action at the same time.

The hard disk comes pre-installed with a bootable DOS (3.10) full partition. Pre-installation is standard practice. At the time of writing, the base price includes Microsoft GW-Basic and the Perfect II Business Suite; Perfect Writer, Perfect Calc and Perfect Filer. Nine diskettes are

supplied along with documentation and the Australian distributors are examining other software offerings for possible bundling.

The basic package also includes Ferranti's implementation FBASIC-A which provides access to the high-resolution color graphics. It includes enhancements such as redirection, a SHELL for executing DOS commands directly, directory management, user-definable event trapping and an improved editor.

Apart from the three volume Perfect documentation, there is a boxed Basic Reference Manual which describes both BASIC-A and FBASIC-A. Another boxed offering is the User

Guide providing basic hardware information, MS-DOS documentation and a healthy set of appendices. Despite the reports of some other reviewers, the Ferranti runs both the Microsoft Flight Simulator and Jet without difficulty. We loaded and ran a broad spectrum of other popular packages and found none which refused to co-operate. These included WordStar (3.3 and 2000), Lotus 1-2-3, Symphony, dBase III and FrameWork II.

True multi-user applications really need an operating system like Unix, Xenix or Pick to take advantage of the extra address space of the 80286. Under MS-DOS 3.10, the AT may be used as a file and print server with the Microsoft Network version 1, and other LAN systems are also supported. If extending to LAN or other forms of multiple usage it is possible to add extra disk space internally using either or both of the two available internal half-height positions. As a software development station, possibly in conjunction with a mainframe, the PC2680 is a powerful and cost-effective alternative. Engineering and scientific users will make good use of its speed, memory capacity and graphics capabilities.

One would be advised to check with The Technology Centre for the price for you may be in for a pleasant surprise. At a time when the Aussie dollar's condition (and the recent budget) are causing hardware prices to skyrocket, it seems Ferranti is moving against the tide.

Ferranti is best known in Australia for its large scale defence and aviation systems. Its successful Cruise PC has been on the UK and European markets for some years. Following a decision taken earlier this year a production and testing unit has been set up in Ferranti's Sydney facilities. A 40 per cent local content is claimed, increasing to 50 per cent in the near future. Ferranti has recently appointed The Technology Centre as its sole distributors in Australia and New Zealand, and offers a 12 month warranty on parts and labor with service being provided by Honeywell Australia through 40 support centres around both countries. The Technology Centre will be providing a national sales and after-sales hotline from its Sydney headquarters. ■

PC2680 AT

Australian Distributor

The Technology Centre,
Ground floor, 135 Macquarie Street,
Sydney 2000.
(02) 27 4517

Basic Configuration

Processor: 80286
Clock speed: 6 or 8MHz
Standard RAM: 640K
Maximum RAM: 16M
Ports: 1 Parallel, 1 Serial
Disk drives: 1.2M half-height
floppy
20M half-height NEC
hard disk
Operating System: MS-DOS 3.10

Benchmark speeds (IBM AT-100)

CPU-bound:	133
Disk-bound:	114

Ratings 0 (Poor) to 5 (Excellent)

Value for money:	4.6
Documentation:	4.5
Ease of use:	5.0
Appearance:	5.0
Availability:	5.0
Vendor support:	5.0
Servicability:	4.5

Minor gripes:

No reset switch, slow keyboard auto-repeat rate, speaker somewhat too muted.

Best Points:

Engineering quality, speed, compatibility level, price.

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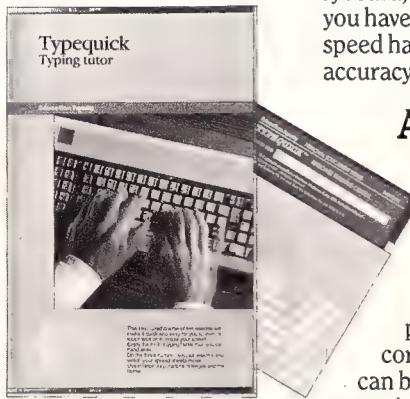
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Gone are the days when typing was just for typists! With the widespread use of microcomputers in all spheres of business and education, touch typing has become an essential skill for everyone from clerks and students to senior executives and academics. Now, using the very computer you want to master, you can teach yourself touch typing quickly and effectively with a special software package that guides and motivates you to achieve speed AND accuracy in ten easy, enjoyable lessons.

Highly sophisticated, superbly organised, yet easy to use and apply.

TYPEQUICK is a far cry from some of the old methods of learning to touch type from a book of exercises. Highly sophisticated in concept and design, utilising the psychology of learning, TYPEQUICK encourages you to set your own targets, leads you through each step and gives you the sense of achievement missing in most "teach yourself" courses.



Learn in your own time, at your own pace, at your own keyboard.

TYPEQUICK consists of ten lessons of around 40 minutes each, using the interesting approach of having you set your own goals. As you proceed, the program monitors and reports your progress. Even more cleverly, each lesson is paced and adjusted for you, based on your strengths and weaknesses, thereby achieving a highly personalised program.

Lessons start with revision and review of progress to date; mistakes produce a warning beep; and reports show which letters are causing you problems. In this way you have constant feedback. The program uses intelligence to speed learning.

Use TYPEQUICK to learn from scratch...or to improve speed and accuracy to top levels.

TYPEQUICK has been designed for both two-fingered typers and for those who can already type but need to improve their skills. Once you're conversant with the keyboard, you progress to speed building sessions, until you have achieved your required goal. When the desired speed has been attained, the program tackles accuracy, until a level of 97% is achieved.

A breakthrough in tutor software! Winner of the 1985 Australian Software Award.

Hailed by experts as "the single most impressive piece of educational software", TYPEQUICK is so effective that it is used professionally worldwide by colleges and major corporations as an in-house staff training aid, which can be used and reused. The TYPEQUICK Kit, comprising diskette and instruction manual, is suitable for everyone from private users and small businesses to major corporations, and is specifically designed for the IBM PC family of personal computers, including the new IBM JX.

Prove that touch typing's a breeze! Put TYPEQUICK in your disk drive and your fingers on the keyboard and judge for yourself! Use this handy order form to request your TYPEQUICK Kit today.

For faster service, simply call IBM Direct and ask for Ext. 140: Sydney 2 0531, Melbourne 614 1511, Brisbane 229 6711, Adelaide 212 6899, Perth 481 3588. In Hobart, Canberra, Darwin and all other areas, phone STD free (008) 22 2224.

YES. I want to learn touch typing and achieve speed and accuracy.

Please send me _____ (qty) TYPEQUICK Kits @ \$87 each.
Tick method of payment:

Enclosed is a cheque/money order for \$ _____
(Make cheque/money order payable to IBM Australia Ltd.)

Please open an account and charge \$ _____

Please charge to my existing IBM account No. _____

Name _____

Title _____

Company _____

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A

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DISK MANAGEMENT

"Indispensable"
—PC Magazine

- UnErase feature lets you restore erased or deleted data.
- Locate files in a flash.
- Security tools wipe files clear of data, or mark them against deletion.
- List and sort directories several ways.

B

THE NORTON COMMANDER



A hard disk organizer

- ★ Point and shoot operation.
- ★ Instant execution of your programs and data.
- ★ One or two directory panels list files by name, extension, time or size.
- ★ Add user menus.
- ★ Pop-up windows.
- ★ Full mouse control.

C

THE NORTON EDITOR

Great for
programmers

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A plea for Xenix

With the increasing volume of material being received at the offices of PC Australia, it is almost worth considering publishing another magazine, of readers letters!

Electronic fanmail

I received today my August issue of PC Australia. I believe that one should be vocal with criticism, but this also carries the responsibility to be vocal with praise when due. I pass on to you my thanks for the free subscription to the magazine, and I congratulate you on the consistently high quality you maintain. Best regards.

Michael Rychter
Viatel No. 237190630

All those PC Australia readers subscribing to Viatel are most welcome to follow Rychter's example and send me an electronic mail message. It is a good feeling when praise like this pops up on to your PC screen first thing in the morning.

Xenix lover's plea

I would like to thank everyone at PC Australia for a great magazine. Les Stein articles would have to be the best in the business; his realistic style of reviewing and writing has helped considerably when deciding on purchases of software. The write-up on utilities ("Grease for the PC", August 1986) left me most impressed.

However, there is one subject I feel PC Australia, along with the other local publications, should cover more often, and that is the use of the Xenix multitasking multi-user operating system for the PC XT and AT. The company I work for uses PCs for spreadsheet and word processing and since magazine reviews are highly prized in deciding which packages to purchase, detailed information on Xenix is greatly missed.

Should you decide to review Xenix, I would appreciate if you could cover the following points; cost and availability, languages available, effectiveness of ATs as multi-user systems, Xenix-to-DOS file transfer,

and speed, memory and disk limitations. This is quite a list, but even a general overview would be much appreciated. It would be most interesting to see if Xenix or future variants of DOS win the multi-user and multi-tasking battles, as this is another area that needs a de facto standard.

Brett Russell
Ulverstone, Tas.

My own experience, and the feelings I get from feedback at user group meetings and seminars, are that most PC users do not have a crying need for high-powered multi-user protected mode operating systems such as Xenix just yet, and seem quite happy to be gradually drawn towards this type of environment through the evolution of good old DOS.

The wish-list continues....

I was interested to read Jim Seymour's guest editorial in the May issue of PC Australia, and have made some notes to add to his Lotus 1-2-3 wish-list.

□ /File Save and /Graph Save: new files are put straight to disk. As my spreadsheets are large and I have found it easier to extract files and store graphs on a separate disk, saving changes to the worksheet becomes a problem if I forget to replace the worksheet disk. Therefore, as with the existing file expression 'Replace or Cancel', it would be nice for a new file to request 'Save New File or Cancel'.

□ /Graph Save: If this command is performed from a macro, the 'New Graph' versus 'Replace Existing' is a hiccup, requiring the escape key to back out to the ready mode.

□ /File Combine: This command is impossibly slow for a named range. I extract the range as a .WKS and combine the file.

□ /Graph Options Legend: This one looks good but the printed output is different, especially when the legends are long. The Printgraph routine only prints part of the legend when three are used and no doubt is worse with more.

□ Printgraph: Why can't the graphs look like the F10 preview graphs?

Maybe the PrtSc key could be used, drawing on the appropriate screen memory area, and Printgraph could become a screen dump! And how about some decent (legible) fonts? I have difficulty deciding between 5, 6, 8 and more. Javelin, for one, is excellent on this point.

□ Circular arguments: These are often very difficult to isolate.

Identification of cells involved would be a start, and perhaps a listing of the cells with formulae, displaying CIRC in a similar manner to ERR. Once again, have a look at Javelin in this respect.

□ Output: The 56 to 60 line output is a restriction, given the standard size is a 66 line page. Options should be able to give more lines by allowing removal of the overheads.

□ Macros: The \XI condition should allow alphanumerics as well.

Finally, the new 1-2-3 manual is not easy to read and it is often difficult to locate specific points. However, I wouldn't want the job of rewriting it. Also, the manual is incomplete, particularly in the area of graph legends as described above. How about a manual supplement on these specific points?

John Glennie
South Yarra, Vic

It seems that we really struck a nerve in the PC community when we ran Jim Seymour's Guest Editorial ("A Disappointing Sequel") in the May issue. It seems that the Lotus 1-2-3 users of Australia could between them compose a new features wish-list to rival 'War and Peace'.

BBS doubles in size

Just a short note to thank you for the article about my PC bulletin board (The National) in your May issue. I am not too sure that those who try to call the board will be as pleased with both the style and content of the article as I am. The usage of the board almost doubled overnight at the same time as PC Australia hit the mail boxes; quite a remarkable result.

In fact your article combined with

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school holidays, increased the board's use to an amazing 18.35 hours in one day, and it hasn't dropped below 12 hours a day since then. Interestingly, these usage figures have held up even though the school holidays are now well past. Please thank Robin Howells for me.

John Blackett-Smith
Hawthorn, Vic.

BBS File has created a renewed interest in PC-based bulletin board services across the country. So if you are a sysop and believe your BBS is worth investigating, give us a call. But be prepared to cope with the rush!

The Lotus-Laser connection

We recently purchased an Impact Laser 800 printer, and I would like to be able to drive it from Lotus 1-2-3. Although it is possible to drive the printer in emulation mode from the device drivers supplied with 1-2-3, it would be nice to be able to use the full range of printer capabilities by

developing a device driver specifically for the Impact. I am, however, unable to find any technical details on the Lotus device drivers and wonder whether you can help.

Mark Diamond
Perth, W.A.

Fae Robinson of Impact Systems
replies: *The way in which the Impact Laser 800 has been designed allows users to run Lotus 1-2-3 and most other popular software under the range of emulation modes supported (including Epson and HP) without losing access to the full range of capabilities offered by the Laser 800. This is achieved by accessing the printer through a transparent code and the use of simple commands.*

Should any printer user require further support or training in the capabilities of the Laser 800, the Impact Technical Support Group can be phoned on (02) 406 6611.

A puzzle page?

I enjoy your magazine — there seems to be a good mixture of articles. I particularly like the Tech Notebook contributions of Ted Mirecki which have been a good source of ideas.

I was reading the Fortran Compiler article by Bill Fitzgerald in the May issue and was looking at his benchmark program entitled **WRONG**. A malicious thought occurred to me. Instead of a "puzzle page" in the magazine there could be a puzzle for PC programmers to go potty trying to solve, where part of the puzzle would be to actually find the **WRONG**! Is there any chance of providing the solution?

I could see no syntax errors, although there are enough logical errors to sink a ship (I would not expect a compiler to pick these up). Out of interest, we ran program **WRONG** at work through the compilers on our Data General Nova 3 (no errors) and our Cyber 380 (with one informative warning about the **m(j)** function not actually using its arguments).

Rob Cannon
Yarralumla, ACT.

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Lapping it up

Now IBM has joined the laptop market there is renewed interest in these small and powerful machines.

PC Australia takes a hard look at eight of them to see how they compare

Portable computing is beginning again. IBM has dignified the market with its presence. The 3½-inch disk drive is a firm standard. Prices are down. And the technology is better than ever.

At the heart of this market is the desire to take DOS along. While notebook computers are fine for light word processing, small spreadsheets and on-the-road telecommunications, they fall short of full compatibility with office systems. Why relearn your key applications or do without some of your favorite features? The new generation of DOS machines is highly compatible with what you use in the office. Most copy-protected programs can generally be installed on the 3½-inch disks.

The state of the portable art has evolved to the point where you can even consider using a portable as your primary computer. Most of the new machines offer "docking" of disk drives and monitors. One (not IBM) even allows you to attach a standard IBM keyboard. All except one (IBM) include a printer port on the base machine.

For our comparative testing, we selected the IBM PC Convertible, The Toshiba T1100, Quadram's Datavue

25, the Kaypro 2000, Zenith's Z-170 PC, the Sharp PC-7000, the Compaq Portable II, and Panasonic's Executive Partner FT-70. These machines are our choice for the serious contenders in the take-DOS-along market today. The new 80286-powered Toshiba 3100 with internal hard disk is a more recent release, along with the Chendai Lap, which is examined in a separate section.

The machines differ widely according to their manufacturers' perceptions of what the on-the-go user needs. Some are battery powered, some not. Some use 5¼-inch disks; others, 3½-inch. Several varieties of liquid-crystal displays coexist with plasma displays, and one sports the traditional CRT. Some have add-on printers; one has a built-in printer. The big issue is: what constitutes functionality? If swapping 5¼-inch disks is at the top of your list, you will be looking at one subset of these machines. If it is important that two or three people gather around the screen to discuss the results, you are into a different group. Other features may be of paramount importance to you. How good is the keyboard layout? How long does the battery last? How heavy is it?

On the following pages, we take a

close look at the real contenders for your portable DOS dollar. These machines have either stood the test of time or have learned from the mistakes of others. So, in ascending weight order, the new generation of DOS to travel.

Toshiba T1100

Of all the portables we tested in this round-up, I gravitated most to the Toshiba T1100. It is the smallest and lightest of the units, a considerable plus when you travel as much as I do. It sports a single 3½-inch disk drive with a formatted capacity of 720K. A full 512K of RAM is standard. The model I tested also had the optional serial port and 300-bps modem. This optional board also gives you a real-time clock. The 5¼-inch disk-drive adaptor is an accessory that you probably will not want to be without. You can, however, make do with a board that lets the Toshiba use the floppy drives on a PC or XT as if they were its own.

The screen is readable under virtually all conditions, provided there is some light. Its tilt is infinitely adjustable through a full 180 degrees, so that it is easy to catch a light source, then adjust the contrast. The viewing angle is sufficiently wide so that two or



three people can gather around and read the screen.

I took the Toshiba on a business trip. The first big difference between a DOS-compatible and the Tandy notebook computers I usually use — besides a weight differential of two-to-one in the Tandy's favor — was instantly evident as I sat in the airport, waiting for my flight to board. Many seconds passed as the machine checked its memory (you can bypass the memory test) and booted DOS. More seconds passed while it loaded the word processing program. I wrote for a while till finally my flight began boarding. My first instinct was to reach for the power switch and stuff the machine back into my briefcase. The CMOS RAM and diskless operation of the notebook Tandy 100 and 200 permit such rudeness; DOS machines do not.

I then saved my file to disk, exited the word processor and packed up. On the plane, I found the Toshiba more usable on the table than my lap.

In the office the T1100 is more flexible. You can dock it to a standard RGB monitor and to its 5 1/4-inch external drive. It even has a switch on the back that makes the 5 1/4-inch the A: drive, a convenience for using copy-protected software that requires a key disk. Its charger and power cord are small enough to fit into the carrying case, a rugged affair made of nylon and rubber.

With the optional serial port you can use your favorite communications

program to transfer files. To save space, the T1100 uses the nine-pin serial arrangement first seen on the PC AT. The sub-panel that carries the RS-232 port also has an RJ-11 jack for the modem. While the unit I tested was limited to 300 bps, Toshiba expects to be delivering a 1200 bps unit very soon. A switch on the subpanel lets you choose modem or RS-232 operation or turn the serial port off to conserve power. The modem is Hayes compatible. I tried Ascom, Crosstalk, and Microsoft Access with equal success.

The battery pack is not removable, and so you cannot carry a spare if you are going to be away from AC power for an extended period. You can, however, use the machine while the battery is recharging. The battery is good for about seven hours of operation, 10 per cent of which includes disk access.

In practice, the function key layout, turned 90 degrees as it is, is learnable, but it leaves the keys reading right-to-left, a bad idea. Left-to-right orientation is deeply ingrained in our culture: it would have been better to number them that way. Far worse is the layout of the numeric keypad. The designers, faced with only two rows in which to place the keys, strung all the odd numbers along the top row, all the even numbers below. Of course, all the ergonomics of the cursor keys, Home/End and PgUp/PgDn, are lost. The arrangement turns all your hard-learned word processing skills into junk.

The rest of the keyboard is quite tolerable. Placement of the other keys follows normal PC practice and the Shift, Ctrl, and Enter keys are conveniently oversized.

The contrast on the screen is good. I never felt the need for backlighting, but the screen attributes are a little strange. LCD displays are graphically oriented, but they must convert colors into shades of grey. Some color combinations though, come out as black-on-black. This result led a couple of reviewers to assume that the machine had crashed a couple of times when all it needed was for the color options to be set to more-compatible choices. The intensity bit turns on a blinking underline, a disquieting divergence from the PC standard.

Other than forcing us to exercise

some care in the screen configuration, the T1100 ran everything we threw at it. If you avoid using the help screens (disk access is slow), 1-2-3 is eminently usable. It is no slower than a floppy-disk PC and while a single disk drive forces you to plan your program/work disks carefully, the 720K is certainly adequate. Microsoft Word looks better on the Toshiba's LCD than it does on a standard IBM Color/Graphics Adapter.

Within the take-DOS-along constraints of this test, the T1100 is a machine to be reckoned with. You can take it on a transcontinental flight, use it the whole way and still have enough juice left over to do a few hours' work before you collapse in a heap. Or it can spend a day in the field, far from AC power. Estimating at a construction site, aboard a boat, it is comfortable and unobtrusive. After a hard day's work, it needs no more recharging than you do before it is ready again.

When it finally arrives in the office, docking it onto a standard RGB monitor and 5 1/4-inch disk makes it every bit as capable as a full-sized PC. Everything you want is right there on the back of the machine. I like Toshiba's approach a lot more than the IBM Convertible's.

Even though it is the lightest unit we tested, I would not want to carry this machine every day. My normal briefcase load is 10 pounds (including the omnipresent Tandy Model 100), and toting the Toshiba along would nearly double that. But I have met some salespeople in airports who trundle a Compaq Portable everywhere, every day. The glittery look they get in their eyes when they see the Toshiba virtually guarantees it a market niche.

IBM PC Convertible

With the PC Convertible, IBM wants to combine dual functions, laptop portable computer and semi-desktop computer. As a laptop portable, the Convertible is quite good, has a very good keyboard, passable LCD display, good family name, idiot-proof DOS shell and well-executed SideKick-like desktop utility set. But compared with a real desktop PC, you give up a numeric keypad, half the cursor-control keypad, full-size function keys, the crisp monochrome display, and EGA color compatibility.



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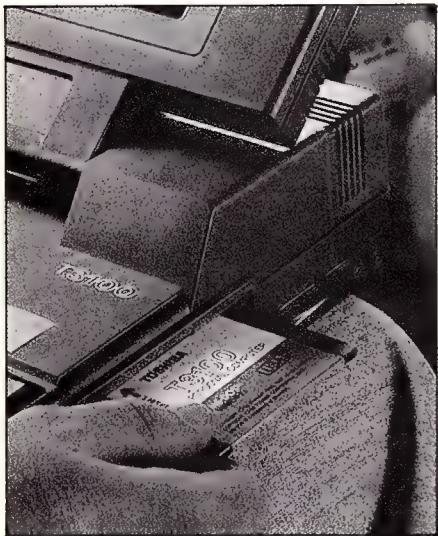
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It also runs into semiserious money. While \$4100 is the list price, you're talking \$3000 to get out on the road with a modem, compact printer, and I/O capabilities, even more with a desktop color monitor, a 3½-inch drive for a desktop PC for file transfers, and sundry cables, chargers, and carrying cases.

The business market is not as price-sensitive as, say, the home or educational markets, but businessmen are not chumps, either. You are paying a bit for those three reassuring letters.

At 13 pounds and 12 by 14 by 2½ inches in basic form, the Convertible is one of the bigger laptops except for the sewing machine units from Quadram and Zenith. And it gets bigger. Except for extra RAM to bring the 256K base unit to 512K and an internal modem (not Hayes-compatible), all expansion is external via a 72-pin expansion bus. Accessories clip to the back in modules, a la the erstwhile PCjr: one for serial and parallel ports, another for CRT displays, a third for a 40-character-per-second (claimed — hah!) printer. It is a truly impressive sight when all three are connected at once for transportation, more than two feet and nearly 20 pounds of beige plastic. Imagine what it would weigh if IBM stuck with 5¼-inch floppy drives instead of the dual 3½-inch Toshiba-made disk drives.

Not only does the screen pivot open, but the disk drives also pop up and the keyboard angles slightly for a better reach. The knife-edged carrying handle

pulls out to make a convenient palm rest.

There are no breakthroughs in the 80 by 25, made-for-IBM liquid-crystal display screen. IBM says it designed a special font for the screen and there is a glare-reducing bonding process attaching the LCD to the protective glass faceplate. Among the laptops tested, IBM and Toshiba probably have the best LCD displays. But LCD technology still is not so hot; all IBM has done is advance the state of the art to the upper levels of mediocrity. It is disappointing. It can emulate the IBM monochrome display or 640 by 200 or 320 by 200 CGA color. Like most laptops, graphics come out squashed because of the screen ratio (much more horizontal than a CRT).

The display would be more readable in low-light situations if it could tilt back to a more horizontal position.

With the Convertible comes Applications Selector, an icon-based DOS shell and System Applications. AppSel lets you suspend an application program by hitting Fn and Esc to use one of the SysApps utilities: Notewriter, Schedule, Phone List, and Calculator. The SysApps are slower but generally more flexible than SideKick. Notewriter is an emasculated DisplayWrite (12K file size, maximum) with adequate print formatting. Schedule, the best of the four, lets you enter appointments at five-to-60 minute intervals (with alarms, if desired). The length of the day can be expanded to cover 24 hours and there is a free-form To Do space for additional daily notes. Daily schedules collapse into weekly and monthly schedules that fit nicely on one screen. Phone List can dial either the optional internal IBM modem or external units. Calculator has a tape trail on-screen.

The System Profile can be configured to retain your current application in memory when the power is off and to pick up right where you left off five minutes later, or the next morning. This feature is standard on diskless laptop work-alongs but not on the machines in the DOS-to-go category.

Of all the laptop portables, the 78-key IBM keyboard is among the best. As well as a 12-inch-wide machine can, it adheres to the layout standard introduced on the RT PC and

continued in the newest ATs and XTs. That means a separate cursor pad, function keys along the top, respectably sized Shift and Enter keys and Ctrl hidden in the bottom left hand corner. An Fn key (not to be confused with the F1-F10 function keys), last seen on the PCjr, turns the right side of the keyboard into a numeric keypad and doubles the cursor keys as PgUp, PgDn, Home, and End keys.

For use in the office, IBM offers 9-inch composite monochrome and 13-inch RGB color monitors on pedestals. The mono unit looks for all the world like an Apple IIc monitor. Resolution is not bad, but it is not the standard monochrome display, either. IBM missed the boat by building an external adaptor that ignores IBM's two best displays: (real) monochrome and Enhanced Graphics. Serious desktop users are not going to be satisfied with no numeric keypad and half the cursor keys.

Even though the Convertible had been a public rumor for longer than the product life of some PC clones, one impression is that of a machine that was turned loose from the lab before it was fully sorted out. Despite space-saving surface-mount componentry and the exile of I/O functions to external clip-on slices, the machine is big for what it does. Forget about using the Convertible when flying unless you have a seat on the emergency-exit aisle.

Still, IBM has taken a bold step with 3½-inch drives and with its clout, is the only company that can wean the industry away from the twice-as-big, half-as-much-data 5¼-inch floppies. Big Blue has also done a nice job of putting the speed of a desktop PC into a 13-pound package that can run for a full working day on a single battery charge. The processor (80C88) is just as fast and so are the drives; in benchmark tests we found that the laptop actually outran the stock PC in some cases. Front-facing drives are more convenient than the side-mounted drives of the competition.

With the PC Convertible, IBM has given an aura of legitimacy to the MS-DOS laptop marketplace without unleashing an overwhelming technical tour de force. Do not be misled by the Convertible moniker. This is a solid laptop portable that coincidentally can

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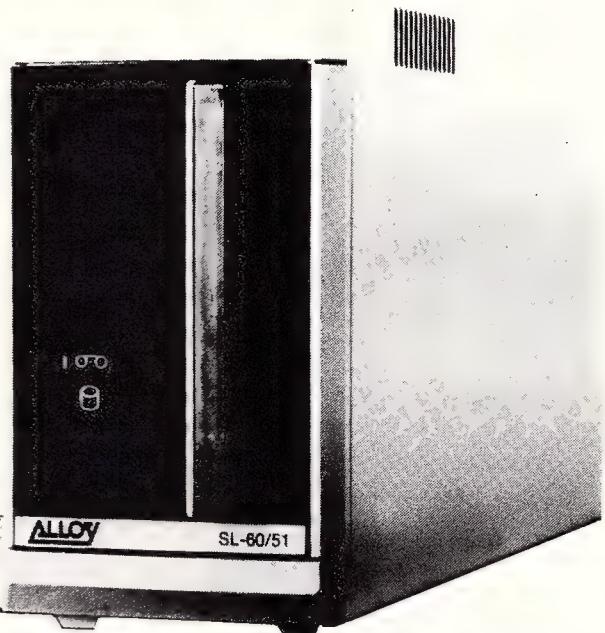
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LAPTOPS

be used with a CRT on a desktop just like nearly every other DOS-to-go laptop on the market.

Kaypro 2000

It is surprising to see something as snazzy-looking as the Kaypro 2000 emerge from a company that has spent years producing computers packaged in tin cans. The 2000 is not only good-looking; it is basically a good design, flawed by some compromises that seriously affect its use as a laptop PC.

Somehow, Kaypro can not bring itself to save a few pounds by shrouding its laptop computer in plastic (like everyone else does) and so the 2000's sleek case is made of black anodised brushed aluminium. However, the weight penalty of the metal case is not as bad as one design feature that did not even have to be part of the case in the first place: the only way to switch the 2000 on and off is by opening and closing the case. When you have to get up to let someone into the next seat on a plane or train, you will probably shut the thing off, accidentally if not on purpose. Kaypro's designers put a great deal of thought into the design of the 2000's keyboard. It has the usual complement of PC-compatible keys, albeit with the function keys arrayed across the top of the board and an oddly shifted array of four cursor keys on the bottom right hand side. The feel is good, and it has adjustable feet, like a regular PC. Best of all, you can remove the keyboard from the case. This design is especially handy when you are working on a desktop or on an airplane's tray-table because you can move the keys to wherever it is most comfortable for you to type on them.

The screen is not the worst LCD display I have seen, but it is not much better. It has no contrast adjustment, and its viewing angle cannot be changed. The only viewing angle that worked for me was to look at the screen from slightly below the horizontal plane. Fortunately, the 2000's detachable keyboard comes to the rescue: you can pull it out of the case and perch the rest of the computer on a pile of telephone books. That solution works well in the office, but I left the 2000 behind rather than try it out as a commuting computer. It uses a single 720K 3½-inch disk drive that is housed entirely inside the case when

the cover is closed. That is good design thinking in a market where the competition thinks it is perfectly fine to leave doorless 3½-inch drives exposed to the elements. Kaypro's designers even had the foresight to include a disk carrier inside the case that can house up to three disks besides the one latched into the drive.

It is unfortunate that there is only one drive on the 2000. Even though it will carry 720K in an IBM PC Convertible-compatible format, many of my favorite applications programs barely fit and the number of working files you can include is small as a result. Kaypro does supply optional disk drives (both 5¼ and 3½ inches) that can be attached through the expansion bus on the bottom of the case, but, once again, this is supposed to be a laptop portable, not a desktop machine.

Kaypro's price seemed aggressive until IBM's PC Convertible (with two 720K disk drives) came out. If you care for the software included in the package, it still may be a bargain. (WordStar, MailMerge, CorrectStar, and StarIndex, the MITE communications program, and PolyWindows Desk).

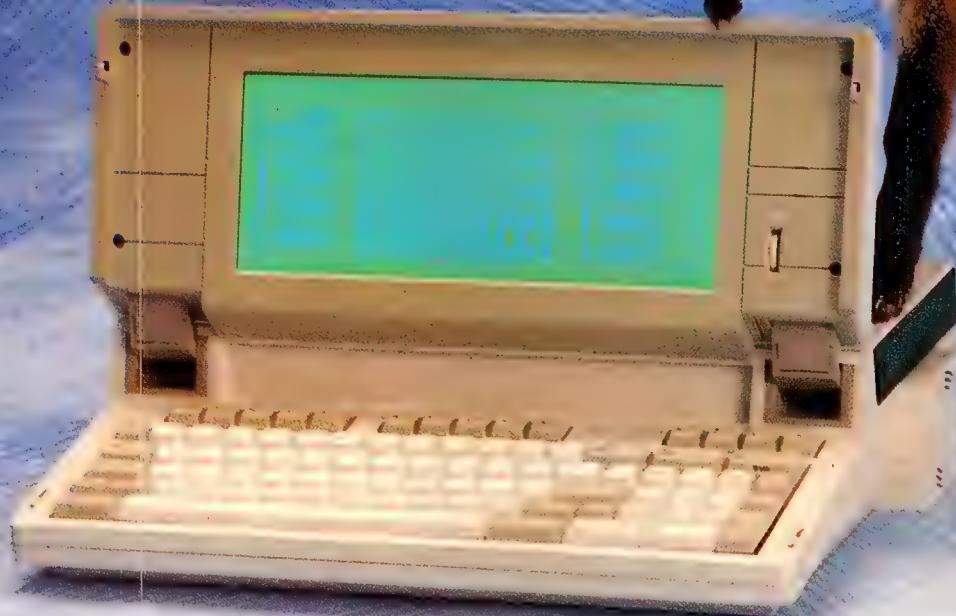
The Kaypro 2000 was powered by an NEC V-20 processor running at 4.77 MHz. A call to Kaypro revealed the company's new policy of using a CMOS version of the more powerful Japanese Intel 8088 clone. I had no difficulty running PC software that had been transferred to the 2000's 3½-inch disks. Microsoft Word 3.0, when run in graphics mode, reveals that the Kaypro's ROM graphics character set is crisp and finely stroked, making it much easier to read than the machine's normal text font. Other products, including the applications, bundled by Kaypro, ran without incident, and resident programs caused no special problems.

I want to like the Kaypro 2000 for its good features, but its bad ones prevent me from recommending it. If Kaypro fixes the screen so you can see it, adds a second drive, and lightens the case, the 2000 will be a serious contender in the laptop PC market.

Zenith Z-170 PC

I spent the better part of a weekend pecking away at the Zenith's keyboard and came back to the office favorably

Portable cunning The Chundai Lap



The Chundai Lap is definitely very cunning. After all, it's the world's first lap portable computer with a 20 Megabyte internal hard disk-drive. And it really is portable, not just transportable – in fact the Chundai Lap weighs in at only 7.5 kgs, hardly a heavy load.

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impressed. Its LCD screen is backlit with electroluminescence, which is a decent compromise solution to the portable-screen problem. LCD screens are light-weight and consume relatively little power but are generally difficult to see in poorly lit rooms. Lighting the back of the screen allows you to use the Zenith in a normally, or even dimly, lit room. The only drawback is that it is nearly impossible to see the Z-170 PC's screen under bright lighting, such as working out of doors on a sunny day. Zenith could solve the problem by adding the matrix adjustment usually found in LCD displays, making the screen angle adjustable, or both.

The LCD screen is fully compatible with IBM's CGA; it works as if you have a composite monochrome screen attached. It had no trouble running such graphics applications as 1-2-3 and Microsoft Word, no difficulty handling programs that do direct screen-memory writes, such as XyWrite II Plus, and, for that matter, no trouble handling screen writes that use DOS and BIOS function calls. Zenith also sells a standard color screen and monochrome screen adaptor for the Z-170 PC, but I did not test them for this review.

The Z-170 PC's toolbox shape makes it unusable as a lap computer (it is too top-heavy to be stable on your knees), but its reasonable 14½ pound weight makes it eminently suitable as a portable tabletop machine. All you have to do is plunk it down on a handy

Problems with LCD screens

Ordinary newsprint has a light-dark contrast ratio of 8:1. Nonbacklit LCDs all hover around ½:1 or 3:1, about the same as an elephant in a fog bank.

LCD screens are built around layers of molecules that react to electricity; when current is applied the molecules twist, changing the polarity of the reflected light. This "nematic" layer is sandwiched between a grid of electrodes running in one direction behind the panel and a transparent, perpendicular grid in front. Normal LCD molecules twist 90 degrees, yielding an image about as sharp as a tenth-generation Xerox.

In an effort to boost readability, Swiss researchers developed a "supertwisted" nematic panel that tweaks molecules 270 degrees, kicking up the contrast to 7:1. Backlit LCDs, like those in the Zenith, Sharp, and Quadram, toss in a layer of electroluminescent (EL) material that emits light when current is applied to it. Unfortunately, this uses far more power than a conventional LCD and ends up washing out the image in direct sunlight.

Plasma screens sandwich the standard silk-screened silver electrode grids around a manganese dioxide plate full of tiny neon-filled holes. This is the light-emitting method of choice, since it can be manufactured in large sizes; EL displays must be stamped out of wafers, with low production yields and EL screens require dense, high-powered chip-driver circuits that draw prodigious amounts of current, which means they cannot travel too far from a wall socket.

Screen ergonomics are nearly as important to readability as screen physics. You can view the plasma and CRT displays clearly from any angle and in vastly different light conditions. LCDs thrive in strong, direct light while backlit LCDs pale on a sunny day; plasma is even more impressive than usual in a softly lit 747 cabin.

Full-screen 80 by 25 LCDs, which work by twisting light, end up twisting users' necks. You have to make constant adjustments in viewing angle when jumping from the top to the bottom of the screen. Some laptops, like IBM and Toshiba, make minor positional changes in the screen easy. Others do not, and while the Convertible handled screen attributes perfectly, many of the laptops we tested choked on colored text. These days it is common for popular DOS programs to come up in something like yellow-on-blue. IBM's laptop displayed everything adroitly. Quadram's backlit yellow Datavue, which earned high marks for general clarity and contrast, did the next best thing by offering four grey-scale shades. The Toshiba and others worked fine if a character attribute was black-on-white or white-on-black, but stumbled over everything else; all you end up seeing on these is a string of small black blots. Our benchmark menus often resembled stark Rothko paintings.

Eighty-width LCD screens end up producing squirrelly, squinty characters; plasma text is far superior. Panasonic's dense character box is almost as good as IBM's standard monochrome screen. Kaypro's single-dot graphics character set impressed our reviewers, but worked only with graphics-oriented programs such as Microsoft Windows. Toshiba's screen had special trouble with high-intensity attributes, which it identified by drawing a horizontal line through each character.

But no matter what designers do, LCD screens still look to many observers like Etch-a-sketch toys, or grey chalk on a dirty blackboard. Most of the laptops we tested are adequate for the few people who demand full-screen IBM-compatibility on the road. Until the display technology improves, however, laptops will continue to be a niche rather than a mainstream direction.



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(hopefully sturdy) table, open the keyboard/screen cover, switch it on and get to work. The Z-170 PC will run for two to three hours on its battery pack or, you can plug in into the mains supply using Zenith's 12-volt DC power supply (which doubles as a recharger for the battery pack). It will boot your favorite version of DOS (Zenith supplies MS-DOS 2.11, but I ran it using PC-DOS 3.2) and run most IBM PC applications without problems, and with the kind of performance you have come to expect on a floppy disk-equipped PC.

Zenith's keyboard is not snappy like IBM's, but it is not squishy like Compaq's marshmallow masterpieces either. Its feel is easy to get used to and, save for a minor problem or two, its layout is not bad, especially when you consider the sorts of design compromises that generally go into portable keyboards. One problem is the cursor-control keys, which are lined up on the lower-right-hand side of the keyboard in an uncomfortable "left, right, up, down" order. The cursor keys' secondary functions (Home, End, PgUp, PgDn) are accessible only by pressing the Right Shift key, which seems reasonable until you use it for a while, at which point the Left Shift key seems like a better choice.

The other problem is the function keys (which, by the way, are laid out straight across the top of the keyboard). Zenith chose membrane switches for them instead of normal typewriter-style keys and to say they

Entering the information

The keyboards are nearly as varied as the machines themselves. More than any other component, they determine how compatible a computer will be with the way you work. When evaluating keyboards you must consider two major elements: key placement and touch. Of the two, placement is more important, because you can adapt far more rapidly to machines with a different touch. We consider emulation of the cursor controls in the standard PC keyboard to be of paramount importance. The position of the function keys is less important, but the more reminiscent the keyboard is of the PC, the more likely you are to be productive with it.

A large part of your satisfaction with a keyboard will be determined by the size and positioning of the "reach" keys, including the Shift, Ctrl, Alt, Esc, and Backspace keys.

The touch of a keyboard is determined by several things: the key travel, resistance, tactile feedback, shape, dishing, and sculpting. It is easy to get over technical in describing key travel, but a good keyboard generates its characters at the midstroke point. That design prevents you from generating unwanted characters by "tickling" the keys. It also gives you overtravel, the distance from the character generation to the end of the key's travel. The board supporting the keys should not flex as you press on the keys; the landing should be firm.

IBM has trained users to expect an over-centre click at the point at which a character is generated, a throwback to typewriters and keypunch machines. Throwback or not, it is reassuring.

The final factor is rollover, or the number of keys you can press simultaneously without confusing the machine. A machine with n -key rollover records all the keys you press, in the order you pressed them, no matter how many are down at the same time. A machine

with two-key rollover records only the first two strokes; all subsequent ones are ignored.

The IBM PC Convertible's keyboard shows some honest research into ergonomics. The cursor keys are separate, and while they do not emulate the PC's keyboard, they are eminently usable. Keys have an over-centre click and good over-travel.

The Toshiba T1100's keyboard is flawed by the designer's inability to deal with the IBM keypad and cursor controls. Otherwise, it is a nice keyboard.

Quadram took a different tack with its Datavue 25, displacing the numeric keypad upward and to the left. You can adapt quickly to this layout. Because this is an infrared keyboard, there is no rollover.

The Zenith Z-170 PC keyboard is a little too flexible for power typists. It bends under hard typing. The feel is not bad, but some of our reviewers objected to the membrane function keys.

The Compaq Portable II's keyboard is full-size and full-function. It is easy to adapt to the function key location, and the keypad is home sweet home. IBM diehards will not like the rubber-dome technology, but it gives an over-centre feel, and it is quiet.

The Panasonic Exec. Partner FT-70's keyboard is dished and sculpted, with a light touch and fast action. Its function key placement is acceptable, the keypad mimics the IBM standard, and the "reach" keys are conveniently oversized.

The Kaypro 2000 folds the numeric keys into the typing field. Key placement is otherwise OK. A secondary function key shifts the meaning of the cursor keys to PgUp, PgDn, Home and End. This idea was good enough for IBM to borrow for the Convertible.

The Sharp PC-7000 keyboard has a full-blown numeric keypad, a light, quiet touch, and a place to hold function-key labels. The three "lock" keys are even illuminated. It is a lot like the Compaq keyboard.

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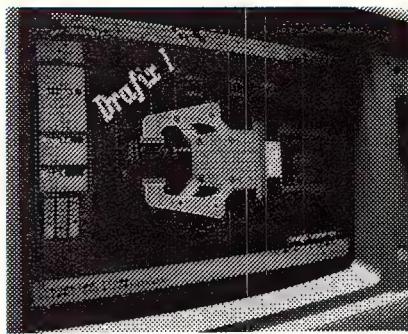
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are unpleasant to use is an understatement. When you press a function key on the Z-170 PC, it feels about as wonderful as poking your puppy in the eye. I avoided them like a plague-ridden flophouse.

The Z-170 PC's disk drives are one of my favorite topics. They are one-third height, 5 1/4-inch floppies capable of reading anything you produce on your desktop PC. The best part is that they are installed conveniently on the right-hand side of the machine. You quickly get used to which one is drive A: and which is B: and start changing floppies without even peeking around the corner.

I ran a full complement of PC-compatible software on the Z-170 PC and ran into only one or two minor problems. XyWrite II Plus occasionally lost hold of its keyboard, but that is not unusual because of the program's unusual keyboard handler. 1-2-3, Release 1A, also had problems with the Zenith's keyboard. When you view a graph (using either the /Graph menus or the F10 key), it appears for only an instant because 1-2-3 decides you pressed another key and immediately removes it from the screen. In my test, no amount of coaxing (such as removing ProKey, Version 4.0) would fix the problem, but switching to Release 2 of 1-2-3 did. Microsoft Word 3.0 ran in graphics and text modes with only a very minor keyboard problem.

WordStar, IBM Personal Editor 2, The Norton Utilities, SideKick, PopDrop, and a raft of utility programs ran without incident, except for occasional minor color problems. I even persuaded IBM's TopView to run as successfully as it can on a floppy disk-based machine.

The Z-170 PC comes with built-in applications that can easily replace SideKick or any other pop-up "desktop" utility you might use. They include a calculator, an appointment calendar with a built-in alarm clock, and a telephone dialer/communications package that works with the Z-170 PC's built-in modem. The calendar and dialer use nonvolatile RAM to store your information (it can be backed up onto disk with a Zenith-supplied utility) and all programs use a permanent RAM buffer for saving the screen (do not worry, it is big enough for a high-

resolution graphics screen) when you run them. The buffer can cause you some confusion because CHKDSK reports a memory total that does not include it, and you will wonder what happened to all that memory you just paid for.

Zenith offers several options including a hard disk for the Z-170 PC, but I think you will find the machine to be fully serviceable as a portable as long as you install at least 512K of RAM and no other options.

Datavue 25

Like the Zenith Z-170 PC, Quadram's Datavue 25 looks like a cross between a toolbox and a sewing machine but the resemblance is only skin-deep: the Quadram offers seven important options the Zenith machine lacks.

The Datavue 25 can be had with just about any type of flat-panel display or disk drive on the market. Its keyboard is both removable and wireless, and you will be able to buy a second removable keyboard that functions as a standalone notepad computer with its own pop-up display. But most impressive is the 20M hard drive option. The Datavue 25 is no newcomer to DOS-to-go computing. It has been out since March 1985 but the screen options and hard drive models are new this year.

We tested a Datavue 25 with Quadram's preferred display, a twisted-crystal "gaslight" LCD unit; its orange-yellow-green screen (the exact hue depends on your viewing angle) was one of the best we saw. The contrast and intensity of the Quadram gaslight display is the best of any LCD display. Depending on the application, you will have to toggle between six palette settings for the most pleasing display of grey-scale and intensity. Quadram also offers a standard LCD screen (illuminated by reflected light) and a backlit fluorescent LCD, with a greyish-white display. The top-hinged screens adjust slightly for better viewing angles.

For internal disk drives, you get a choice of one 5 1/4-inch floppy drive, two 3 1/2-inch microfloppies, or a 3 1/2-inch drive and 20M hard disk. Morrow did it and Zenith probably will shortly, but Quadram seems unable to fit two 5 1/4-inch floppies inside or one 5 1/4-inch floppy and a

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The machines: a summary of features

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Toshiba T1100	9.08	2.5 x 11.8 x 12	4 x 9	LCD	VG	VG	110/30	G O	6.7	8	512K	512K	512K
IBM PC Convertible	12.5	2.7 x 12.8 x 14.7	4 x 10.5	LCD	VG	VG	110/30	VG O	120-volt only	N/A	256K	512K	512K
Kaypro 2000	12.82	2.3 x 13 x 11.5	4 x 9	LCD	VG	G	110/30	G O	4-6	24	768K	768K	640K
Zenith Z-170 PC	14.48	9.5 x 12.6 x 6	4.5 x 9.5	Backlit LCD	VG	G	110/30	F 4	2-3	8	256K	640K	512K
Datavue 25	16.23	10.5 x 12.8 x 6.3	5.5 x 11.5	LCD: backlit fluorescent or gaslight	VG	E	110/45	F 1	1(lit) 2 (no backlight)	6-8	256K	1.25M	768K
Sharp PC-7000	18.51	8.5 x 16 x 6	4.5 x 9.5	Backlit LCD	G	F	110/50	VG O	120/220-volt only	N/A	384K	704K	384K
Compaq Portable II	26.96	7.5 x 17.5 x 13.8	5.5 x 7	CRT	E	E	150/ 150	VG O	120-volt only	N/A	640K	8M	640K
Panasonic Exec. Partner FT-70	30.39	5.3 x 16 x 21.3	6 x 7.5	Plasma	VG	G	150/ 150	G O	120-volt only	N/A	256K	640K	256K

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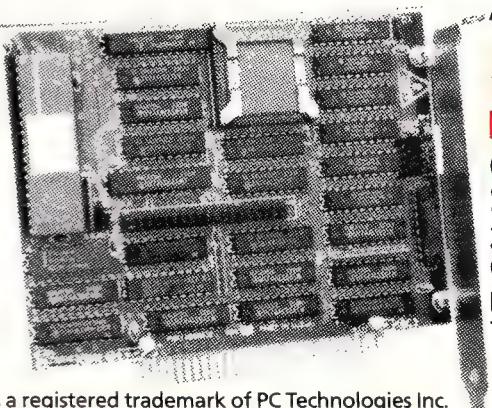
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1 floppy disk	1 proprietary	5¼" floppy disk drive(s), 3½" floppy disk drive(s), CGA-compatible color or composite monitor, parallel port	300/1200	Yes	Editor, communications database, BASIC	None
2 5¼" floppy disks	1 proprietary	Hard disk, CGA-compatible color or composite monitor, monochrome monitor, serial port, parallel port	300/1200	Yes	BASIC	Communications, appointment calendar
1 hard disk 2 3½" floppy disks 1 5¼" floppy disk	1 proprietary	5¼" floppy disk drive(s) CGA-compatible color or composite monitor, printer, modem, serial port, parallel port	1200	Yes	None	Communications
2 5¼" floppy disks	2 proprietary	Hard disk, printer	1200	Yes	None	None
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hard drive. However, an external 5 1/4-inch floppy can be attached to the back of any of the units. That option takes the hassle out of swapping data disks with the conventional 5 1/4-inch PC DOS format when you are on the road. For some inexplicable reason, the onboard 5 1/4-inch drive faces backward; you insert disks with the label away from you. We did not test

the 3 1/2-inch-drive units, but Quadram says they will read and write to the IBM microfloppy format.

The Datavue's 84-key keyboard unclips from the system unit and operates remotely using an infrared beam. Four penlite batteries power it. As laptop keyboards go, the layout is quite acceptable: ten function keys in a row above the number keys, the

numeric/cursor pad in the upper-right-hand corner, an oversize Enter key. It has none of the schizophrenia that surrounds the Toshiba T1100's layout, certainly. All the same, in a round-robin test of keyboard feel, the present Datavue ranked near the bottom.

However, Quadram intends to replace the keyboard soon with a more substantial mechanical version. It

Introducing DOS 3.2

As usual with new PC-DOS versions, PC-DOS 3.2 has been released in conjunction with a new product (the PC Convertible), but it can run on all previous members of the IBM PC family. PC-DOS 3.2 is available on either one 3 1/2-inch 720K disk or two 5 1/4-inch 360K disks. These disks include everything in PC-DOS 3.1, plus three new programs making PC-DOS 3.2 the most expensive yet.

The shining star of the PC-DOS is XCOPY, a fast file-copy utility that combines features of COPY, BACKUP, and RESTORE. XCOPY is fast because it reads as many files as possible into available memory and then writes them out to the target.

Like COPY, XCOPY has a /V switch to verify all file writes. Like BACKUP, it has /M and /D switches to restrict copying based on file modification or the file date. A/S flag lets XCOPY find files in nested subdirectories and create the sub-directories on the target disk if they do not already exist. A /P switch prompts you with a "Y/N?" for each file, and a /W switch lets you swap disks before XCOPY starts up.

You can also use XCOPY as a backup utility. The advantage over BACKUP is that the copied files are directly usable. On a Bernoulli Box attached to a PC, I XCOPYed 1200 files from one 10M cartridge to another in just under 15 minutes. The bonus, of course, is that the files are unfragmented on the target cartridge. However, XCOPY's usefulness for backing up hard disks is diminished by two problems: first, it does not recognise hidden files,

which are used by many copy-protection schemes, and second, it has no built-in provision for changing target disks when they become full.

The second new program in PC-DOS 3.2 is REPLACE, yet another file copy utility. REPLACE can replace all copies of a particular file (which may be located in various subdirectories of a hard disk) with a new version. Using a /A switch adds the source files to the target without overwriting existing files.

The third new program is DRIVER.SYS, a device driver that can be included in your CONFIG.SYS file. It lets you create a new logical disk drive letter that references the same physical disk as an existing disk drive letter. This type of thing happens automatically on a PC with only one disk drive: logical drive letters A and B both refer to the same physical disk drive. DRIVER.SYS lets you do the same thing for another drive.

This is most useful when installing the external 720K 3 1/2-inch disk drive in a PC, XT, or AT. By using DRIVER.SYS to give this disk drive a second drive letter, you can XCOPY files from one 3 1/2-inch disk to another using the same physical drive.

PC users who have been getting an "Out of environment space" message after executing a few too many SET commands from batch files need no longer resort to patches or undocumented COMMAND.COM switches. If you specify COMMAND.COM as a SHELL program in your CONFIG.SYS file, you can use the /E switch to specify your environment size up to 32K. Note

that this is the same switch that worked (but was undocumented) in DOS 3.1, but the DOS 3.1 switch required a 16-byte paragraph environment size instead.

Some smaller changes: FORMAT and DISKCOPY now support the 720K 3 1/2-inch disk format (of course). FORMAT 3.2 will not run unless you give it a drive letter parameter; an added barrier to accidentally formulating your hard disk. ATTRIB 3.2 lets you manipulate the archive attribute of files as well as the read-only attribute.

The disappointing aspects of PC-DOS 3.2 are its omissions. Although Microsoft has stated that future versions of MS-DOS will support the Lotus/Intel/Microsoft Expanded Memory Specification, that support is not included with PC-DOS 3.2. ANSI.SYS 3.2 does not support the EGA in 43-line mode or for video pages other than page 0. No changes at all have been made to ANSI.SYS.

BASIC 3.2 includes some support for the EGA, but this support is minimal. The PALETTE command lets you manipulate the EGA palette registers so that you can map default colors to other colors. This is particularly useful in medium-resolution mode because it means you are no longer stuck with the same two sets of three colors.

The PALETTE command is the extent of EGA support in BASIC 3.2. In fact, the SCREEN AND PCOPY commands do not even recognise the additional video pages in the EGA's 80-column text mode. Support of the EGA graphics modes is nowhere to be seen.



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LAPTOPS

should also be shipping its intriguing Keystyle 80, a replacement for the stock keyboard. The front of the keyboard flips up to reveal an 8 line by 80 character LCD screen; combined with software and memory inside the keyboard, it can function as a standalone notepad and transfer files. Base units of the Datavue 25 come with 256K of memory, but a cubbyhole on the side holds an expansion card for an extra two or four banks of 256K RAM chips, which allows you to upgrade to 768K or 1.25M of total memory. Memory beyond the 640K DOS limit can be devoted to a RAMdisk but not to the Lotus/Intel/Microsoft expanded memory specification, which allows bigger spreadsheets.

Just below the memory slot is a second slot for an optional Hayes-compatible 300/1200-bps modem. A third opening is for the AC adaptor or a battery pack that should give two to three hours a charge with the illuminated screens. Unfortunately, the machine cannot be used while the battery is being charged but it can be run on AC, then recharged later.

Behind are serial, parallel, RGB video, and composite color monitor outputs, as well as the expansion-bus connection used by the outboard disk drive. On top is a carrying handle, a nicety left off the Zenith lookalike.

The operations manual is a model of concise, useful information for users with some PC experience. In fact, the Datavue as a whole offers many features of interest to most experienced users: the ability to skip the leisurely memory checks at startup, automatic configuration of a 360K or 720K RAMdisk, a battery-power-cutoff option for the floppy drives (they get power only when accessed), a slot for an 8087 math coprocessor, and a world clock that displays local time, GMT, and the time in 23 other cities.

Like the Zenith, the Datavue 25 appears destined for a niche-within-a-niche market. It is for the person who needs an illuminated screen away from the office but who is not willing to accept the bulk of the Compaq as the price to pay for a truly excellent screen display. With an 8087 math coprocessor installed, the Datavue can do credibly speedy 1-2-3 spreadsheet work. Because the illuminated screen is tough on the battery life, the Datavue



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(except in the base LCD configuration) probably is not for someone who needs to work away from the mains supply.

Quadram might find itself with an unmitigated success on its hands with a few minor adjustments: make the memory beyond 640K available for expanded memory, beef up the keyboard (in the works), and make the standalone Keystyle 80 a modest-extra-cost option rather than a separate product.

Sharp PC-7000

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The Sharp has a 25 by 80 backlit LCD screen (referred to as an "illuminated crystal display"), capable of 640 by 200 bit-mapped graphics. I generally cannot stand an LCD screen. Having worked with a variety of portable LCD screens, I have been able to tolerate only a few. I like my Radio Shack Model 100 because the characters are large and because it has a contrast knob that lets me adjust the angle of the crystals in the display for maximum contrast.

The backlight element and display are based on a new approach to LCD technology, which improves the contrast and legibility. You can choose between three brightness levels and between regular (black on white) or inverse display. It also has a panel that tilts forward from the bottom at the touch of a large button and a contrast-adjustment like the Model 100. The result is that the display is extremely flexible. I have worked in front of sunny windows, in a dim den in the wee hours of the morning, on a kitchen table and in a fluorescent-lighted office: in short, anywhere I could find a square foot of space and a power outlet. Adjusting the brightness and angle helped, but being able to make the fine contrast adjustments made the difference between satisfaction and terminal frustration. The 9 1/2- by

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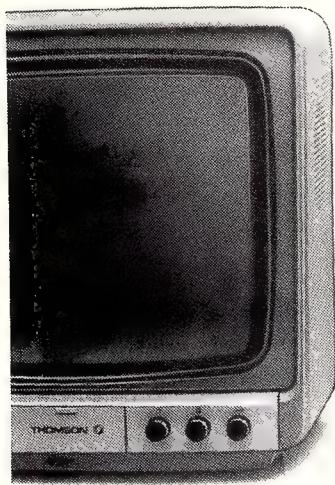
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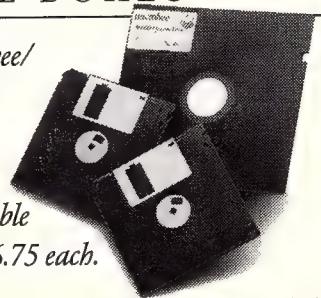


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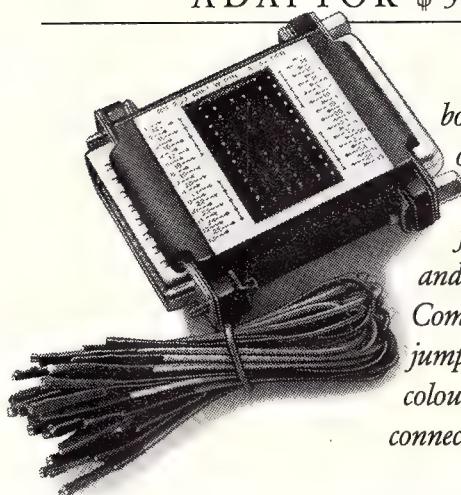
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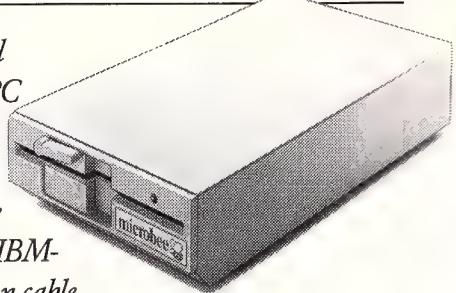


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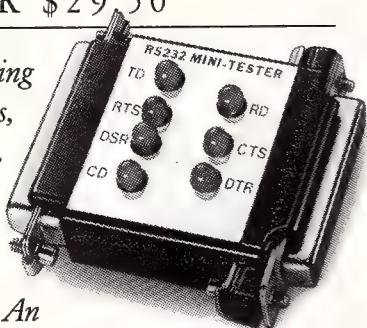
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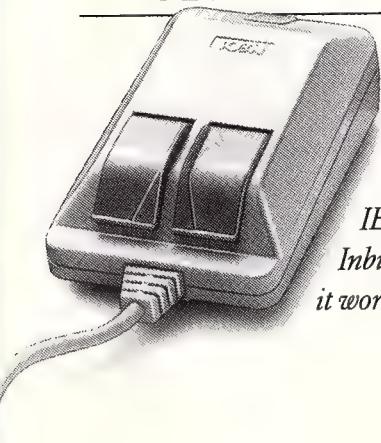
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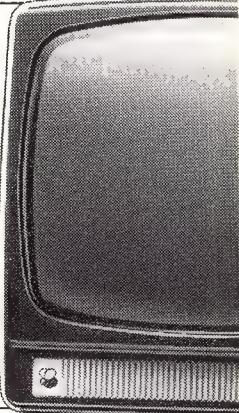


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4-inch dimensions give it shorter and wider proportions than a CRT display, but it is large enough and sharp enough to read easily. As with any LCD, it cannot display highlighted text as brighter, so you must settle for bold instead. The character set is similar to the PC CGA and is acceptable.

One of the slowest performance features of the computer is its display; there is a limit to how fast you can redraw an LCD screen with 128,000 dots. Sharp solves this problem in part by redrawing from more than one line at a time. When you switch screens you may notice the display filling both from the top and from some distance down the middle. This is especially noticeable when scrolling on a Lotus spreadsheet. The overall effect is slightly distracting but better than a slower display.

The backlight element evidently wears out. Sharp predicts that the screen will lose half its brightness after 1000 hours of use at full brightness. Rather than keep you on a short leash from the service department, Sharp made it easy for you to replace the element yourself. You can simply swing the bottom of the display panel up and away from the computer, then disconnect some wires, slide out the element, slide a new one in and hook it up, drop the panel and power up. The first time it took me less than two minutes to make the switch. The designers did not stop there, either. Don't like the "white" display? Fine, just put in the green element next time. (Look out however, the green display is an electric, DayGlo lime that is not for those of weak constitutions. I prefer the white.) Sharp deserves a special commendation for respecting the abilities of its users in this part of the design.

Another feature you will soon discover is the "Screen Standby" status light. If you do not press a key within a certain length of time, the backlight element switches off (to prolong its life). You can select the delay (from two minutes to five or 10 minutes, or forever), depending on how long your ruminative pauses last. When the time limit is passed, the screen darkens and a little message light appears in orange above the green power light to the right of the screen. Just press any key (even Shift), and the screen springs back to life.

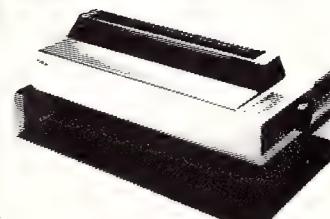
The front panel has two other indicators. The two floppy disks are mounted on the right-hand side out of sight. Because of this design, disk activity indicators would not make much sense in the traditional locations. Instead, they are part of the front-panel display, winking green LEDs on and off as they are accessed. The two Canon drives are so silent that without the status lights you would not know anything was happening. Incidentally, the two half-height drives are custom-built into a single housing, so you can forget about pulling one and dropping in a hard disk in its place. (There are some other fatal drawbacks to such an idea, as you will see).

The keyboard is one of the Sharp's best features. Unlike most of its competition, it is detachable, complete with a coiled cable that is a useful 13 inches long (contracted length). The keyboard itself is full-size AT-style, except that the function keys are arranged along the top left edge. It is 16 inches wide and 7 inches deep,

complete with two-level legs to give you a choice of angles. It has indicator lights on the CapsLock, NumLock, and ScrollLock keys. The standard size and layout of this keyboard make it easy to use, and the detached design permits the flexibility required in many situations. Its only shortcoming is that it has a very light touch and offers little or no resistance. I am not a world-class typist, but my error rate goes way up on this keyboard.

Inside, the machine boasts a motherboard with an 8086 to drive the works. It has only a few options available, but you are invited to install them yourself. You can bring the memory up to 704K simply by plugging in 4 by 64 256K chips, and you can add an internal 1200-bps direct-connect modem, in addition to the RGB board mentioned above. There are little knockouts that you can remove to give access to the new connectors as you add them. You can also add an 8087 coprocessor if you want. You cannot add IBM cards,

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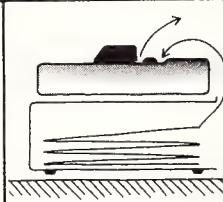
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however. For that, you must get an expansion unit, which would seem to defeat the portability advantages. Still, with the two ports, a modem, and a color monitor, you probably will not need much more. If you want a printer, Sharp also has an 11-pound dot matrix designed to hang on the back of the computer, but we did not test that as part of this review. (As just another example of thoughtful engineering, the PC-7000's handle can be put in either of two positions: one that is balanced for the computer by itself, and another that is balanced when the printer is on the back.)

Another small drawback is that the PC-7000 weighs almost 19 pounds. It is so small, however, that you might not believe that it weighs so much until you put it on a scale. At 16 inches wide, 8½ inches tall, and 6½ inches deep, it is smaller than most portable "boom box" stereos.

All this weight is not without good cause; the PC-7000 is densely and efficiently designed. A steel chassis forms the internal skeleton and the power supply (with cooling fan), the shock-mounted disk drives, and the motherboard are securely fastened to its surface. The overall impression is one of thoughtful and professional preparation.

The documentation is also compact and well designed. The operation manual is printed on loose-leaf pages in a typical binder with slipcase. It uses two-color printing and plenty of clean illustrations to make the many features of the system clear. The manual also contains information on all the different options, so that you can see just what you are in for when you install the options yourself. A separately bound paperback manual explains MS-DOS and is apparently the standard Microsoft text with some additional instructional sections written by Sharp. While it suffers from some of the same problems as IBM's manuals (it is difficult to become an expert on DOS just by working with manuals), the documentation as a whole is about as good as you will find.

The PC-7000 comes with MS-DOS 2.11, but BASIC is not included. It is available as an option. I tested it with a GW-BASIC provided with an AT&T 6300 and it ran without a problem. It will also boot PC-DOS 2.1 without any apparent trouble, although you cannot



access the built-in clock-calendar.

SetUp is a nifty utility in ROM that lets you get at most of the parameters of the system with the press of a single key. Through it you can adjust the screen brightness and Screen Standby delay parameters, the time and date, the COM port settings, the size and blink rate of the cursor and much more. You can even set the speaker volume or slow down the processor speed (in case you run into a time-sensitive program).

Since the PC-7000 uses an 8086 running at 7.37 MHz, you would expect it to run fast. Our benchmark tests certainly bear this out. The Norton Utilities' SysInfo utility brought home the fact that this machine is not completely compatible with the IBM since it came up with a rating of 0.0 (an IBM PC rates 1.0, and faster machines have higher ratings). The manual mentions that there are newer BIOS ROMs available; perhaps these would perform better with SysInfo. The benchmarks showed that the disk drives were not as high speed as the brains of the operation; they performed at the same speed or slightly slower than the PC standard drives.

In terms of software compatibility, the Sharp handled everything I threw at it. It ran XyWrite II Plus without complaint, along with PC Write, Enable, SuperCalc3, 1-2-3 (Version 1A), Framework II, SideKick, and Crosstalk. The screen can be set to emulate either the monochrome or the CGAs through SetUp, so you should be able to get just about any program

configured to run on it. They only way I could crash it consistently was to get my PC-DOS COMMAND.COM files mixed up with the Sharp MS-DOS, but mixing operating system files is enough to addle any processor's brains.

I was initially intrigued by the Sharp's price but was fully prepared for another illegible display and another near-miss. Instead I found a useful machine that rapidly made its value apparent.

Compaq Portable II

In almost every way imaginable, Compaq's newest entry, the Compaq Portable II, is in a class by itself among the machines reviewed in this issue. Yet it belongs in this survey: when it comes to taking DOS along, more people have accepted Compaq's solution than any other. And it is not even the heaviest machine we reviewed (the Panasonic Exec. Partner is). While significantly smaller and infinitely more desirable than Compaq's old Portable, the Portable II is still the largest machine we reviewed. It is also the fastest, has the most storage capability and the most readable screen, and is the most PC-compatible. Alone among the entrants, it has both PC-compatible and AT-compatible expansion slots.

The Portable II will never be battery powered, unless you are planning to bring a Diehard along. It comes complete with an 8 MHz 80286, a 20M hard disk, and a single 5½-inch floppy drive. It has 640K on the



motherboard, is AT-compatible, and can take some of the high-tech expansion boards such as Intel's AboveBoard AT and AST's Advantage. The screen, of course, is

Compaq's standard dual-mode monitor. It gives you crisp monochrome-style characters for word processing, and PC-compatible CGA emulation in shades of green for graphics tasks. A Ctrl-Alt key combination switches you back and forth between modes.

Our test machine weighed 26 pounds with the 20M hard disk installed. While the weight saving over its predecessors is significant, the reduction in bulk is at least as important for easier transport. You do not have to bargain with people on 727s to get aisle seats anymore. The Portable II slips gracefully under the tightest seats and is far less of a threat to life and limb when it goes into the overhead luggage rack. Of course, since it is AC powered, it must stay there but when it gets to where you are going, the Portable II does not take a back seat to anything else.

About the biggest difference between the Portable II and a PC is the

keyboard. The Portable II's keyboard layout strongly resembles the AT's, except for the function keys. They are arrayed across the top of the keyboard, a relatively minor departure considering the liberties that some of these machines have taken. Most important, the keypad is exactly as you would find it on a standard PC. You do not need to relearn the cursor controls.

Given Compaq's long history of compatibility, it is no surprise that the Portable II ran everything I threw at it. I tried several different modem cards, including the Hayes 1200B, AST's Reach, and the Qubie 1200. I tried a variety of software, including Crosstalk, PFS:Access, Ascom, and Microsoft Access. Everything ran without a hitch.

I tried a couple of AT-style extended memory cards as well, including RAM-disk software. I encountered no problems, even at the Portable II's 8-MHz clock rate. As always when

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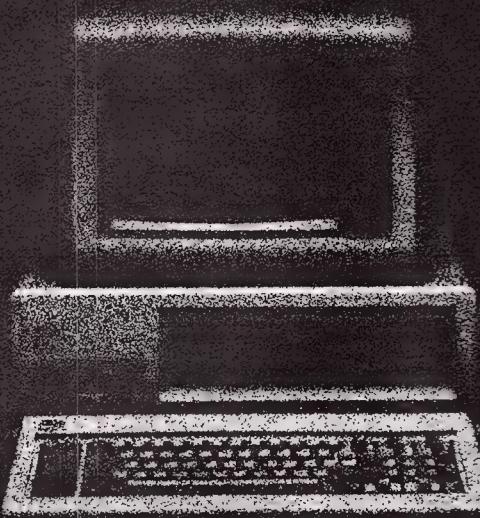
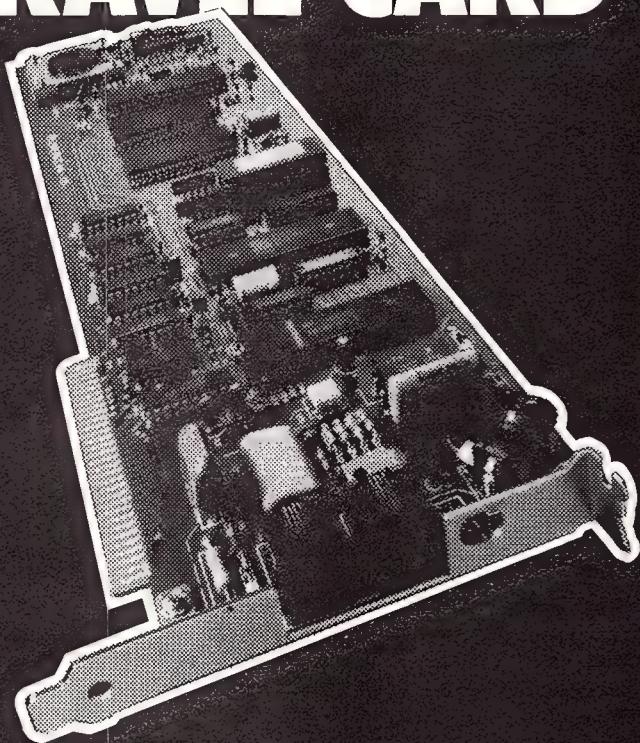
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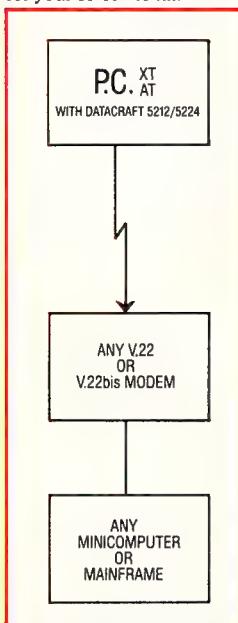
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swapping cards in any of the newer Compaqs, I cursed the designer who specified the star-headed screws instead of the more sensible hex or Phillips heads. The very least Compaq could do is give you a screwdriver or wrench with a matching bit. I have the tools, but how many average businesspeople do? If Compaq has its way, I guess a lot will buy them.

The rest of the testing, with various software packages, was anticlimactic, even boring, but then, that is the way compatibility testing should be. The last thing you want is surprises as you run different packages. Indeed, the Compaq is so deeply ingrained in the marketplace that some products, such as 1-2-3, have special installation routines that get the most out of the monochrome and graphics modes.

The hard disk on our test machine added to our pleasure. It made all the difference in performance and underscored the essential slowness of floppy disks. The hard disk also unleashes the power of DOS. The megabytes of storage mean a rich collection of batch files, sub-directories, utility programs, and other niceties that make working with a PC so convenient and productive.

Although the Portable II is available with floppies only, I do not recommend that configuration. Except by giving up one of the two expansion slots to a hard disk card, you will have a tough time upgrading to a hard disk if you want to do so in the future. Compaq has moved most of the

controller electronics off the PC-style expansion card and put them onto a daughterboard attached to the hard disk. This design saves space but limits your flexibility. Of course, if Compaq really wanted you to do it yourself, it would not have used those star-headed screws.

The Portable II offers 80287 support. If you solve engineering problems or run sophisticated mathematical models in the field, this feature could be significant. Coupled with the Portable II's compatibility with expanded and extended memory cards, you will never have to apologise for its capacity. Its high degree of compatibility makes this machine hard to write about at length. If you know how to use a PC, you are already oriented to the Portable II but that is the idea.

Panasonic Exec. Partner FT-70

The Panasonic Exec. Partner FT-70 has as nice a display as anyone could want, includes a good assortment of standard features and is about as portable as your average three-year-old child.

For all the fine things that the Panasonic Exec. Partner is, it is quite clearly not a laptop. I have yet to see the lap that could hold the Panasonic and I hope I never will.

Superficially, it resembles a laptop computer, but it is in the weight class of the Compaq Portable and other transportables. At 30 pounds, only the strong, determined, or foolhardy would carry this computer for any distance.

Its design presents an additional problem for taking it on the road. The Exec. Partner is very long (21 1/4 inches) and it is not particularly stable when stood upright so it is difficult to put it down without being concerned that it will fall over. But once you get over the desire to use the Exec. Partner on an airplane (or anywhere else you would need battery operation; it needs to be plugged into an AC outlet), you may find much to recommend this machine.

The basic Exec. Partner (the model FT-70, manufactured by Matsushita) includes 256K RAM (expandable to 640K), two half-height 5 1/4-inch disk drives, a built-in thermal printer, serial and parallel ports, and, most impressive, a high-resolution 11-inch

plasma display and a dual-speed 8088-2 CPU that runs at 4.77 and 7.16-MHz.

The plasma display is beautiful, with crisp, well-formed letters. Not only is it easy on the eyes, it is readable under any lighting conditions, and it scrolls without any trace of flicker. The overall resolution is 640 by 400 pixels, although with most software it will only emulate the IBM standard of 640 by 200 (monochrome) or 320 by 200 (color graphics). If you have never seen a gas plasma display before, the orange-on-orange screen might be a bit distracting initially, but you will quickly get used to it and find it a pleasure to work with.

The display lacks a brightness control and a contrast control and will not adjust any farther back than 90 degrees, but these are only minor problems because of the plasma's excellent contrast. The display's one small quirk is the way it treats colors: Panasonic has assigned various colors to different fonts (such as italic, bold, and roman). This method works, although it sometimes results in a pastiche of type styles on the screen. The ability to emulate the IBM monochrome mode and get true underlining would be a nice option.

You can toggle the dual-speed processor from the keyboard by pressing Ctrl-Alt-Plus. The high-speed mode rates a 1.7 on The Norton Utilities SysInfo test and works with all of the software I tried. You can toggle between modes while in the middle of an application if you want to or if you need to for reasons of compatibility. Otherwise, once you try out the faster speed, you will never want to go back to the slow clock speed again.

The Panasonic keyboard is particularly firm and sturdy and is arranged in the standard IBM style, with a few exceptions. The function keys are aligned in a single row at the top of the keyboard, four keys have LED indicators (CapsLock, NumLock, Fast Speed, and External printer), and a few keys are oversized (Return, Shift, and CapsLock).

The Exec. Partner's disk drives perform well despite a higher-than-normal noise level. The disk-drive doors are poorly designed, however; it is occasionally difficult to close them. This drawback is minor, but it becomes irritating if you swap floppies frequently.

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Suitable software

Nine suitable software packages were given to PC Australia for the IBM PC Convertible. Microsoft provided Word 3.0, Project, QuickBASIC, Chart and MultiPlan; Micropro, WordStar 2000 Plus; and Software Source, The Twin, Spellbinder Scientific and Spellbinder Desktop Publisher.

Of these, Microsoft Word 3.0 is the easiest to use and has the best screen resolution for the LCD.

Microsoft Project, Chart, MultiPlan and QuickBASIC are suitable only for restricted use, as the Convertible's small screen gives these packages a very limited display.

The Spellbinder series also appears as black on white, but is supplied with little documentation and help so the full extent of its capabilities on the Convertible could not be tested.

Micropro's WordStar 2000 Plus was totally unsuitable for the Convertible as its white-on-black screen display was almost illegible.

It is obvious that none of these packages have been developed especially for PC laptop models. What software suppliers have done is simply copy the 5 1/4 inch versions of the software onto 3 1/2 inch diskettes.

Margaret Macrae

Heavyweight contender

The recently-released Chendai Lap PC is certainly not the lightest of the laptop compatibles reviewed here, but it does have a trump card up its sleeve — an optional inbuilt 20M hard disk. The closest any other manufacturers have come to this is a proposed 20M hard disk promised for an upgraded Toshiba 3100 before the end of the year, but this will raise its price to more than \$3000 above the Chendai Lap.

The floppy disks used by the Chendai Lap are of the standard 5 1/4 inch variety rather than the 3 1/2 inch microfloppies. As far as compatibility goes, I transferred just about the entire contents of my overcrowded XT to the Chendai Lap via floppy disk, and everything ran flawlessly. Of course, the backlit LCD display had difficulty with some of the more obscure software items, but this was remedied by using the external RGB port and a standard color-monitor.

The Chendai Lap is available as a dual-floppy PC (this is the version offered as a prize in our subscription draw) or as a single-floppy/single-hard-

disk model. Standard features include 640K RAM, real-time clock/calendar, parallel and serial ports, RGB output, composite video output and an 86-pin expansion bus connector. The system is driven by an Intel 80186 processor running at 4.92MHz, and is noticeably faster when running most standard PC software.

Power is supplied either through 110/240V AC, or by using an optional 12V battery pack. Definitely not to be classed as a featherweight, the PC itself weighs 7.3kg, while the battery pack adds 2.5kg and optional AC/DC charger another 0.7kg. The hard disk model incorporates a rather noisy fan but the design and layout of the system are quite neat.

Like most laptops, the function keys have been arranged across the top of the keyboard instead of down the side, but otherwise the layout is fairly standard. Because of its power and weight, the Chendai Lap would more appropriately be classed as a 'transportable' PC rather than a laptop.

Ian Robinson

One issue you will not worry about is software compatibility. I ran SideKick, dBASE II, WordStar, WordPerfect, 1-2-3 (Release 1A), Crosstalk, and XyWrite with no problems whatsoever. Only the lack of extra memory in the 256K review unit prevented me from testing more memory-hungry products like Framework II.

Hardware compatibility is another story. The Exec. Partner has no RGB connector (or even a monochrome one) for an external monitor and it can only accommodate short internal expansion boards (less than 6 inches long). Neither of these drawbacks is insurmountable: since neither the keyboard nor the plasma display is detachable, using an external monitor would be a bit tricky anyway. The capacity for full-size cards would have been nice, but more and more options are available on short cards these days.

The thermal printer is a mixed blessing. It supports both thermal transfer (with a special ribbon) and direct thermal (no ribbon but special

paper) printing. Like most thermal printers, it is slow but steady with fairly good quality; it will accept any screen graphic dump. The thermal roll paper provided with the machine does not travel with the computer itself; you must carry it separately and attach it when you are ready to print. This makes the unit even less portable. While the Exec. Partner's integral print capability is a nice extra, it makes an already heavy unit even larger and heavier. Unfortunately, you have no option here: if you buy the Exec. Partner, you buy the printer.

The Exec. Partner has its drawbacks, but, depending on how you plan to use the machine, none of them are intolerable. On the positive side, the Exec. Partner performs extremely well, especially in its high-speed processing mode. The display is fantastic, and the machine's construction is rugged and solid. The Exec. Partner is a fair value for what you get: a transportable computer that does not sacrifice screen legibility, keyboard feel, or performance.

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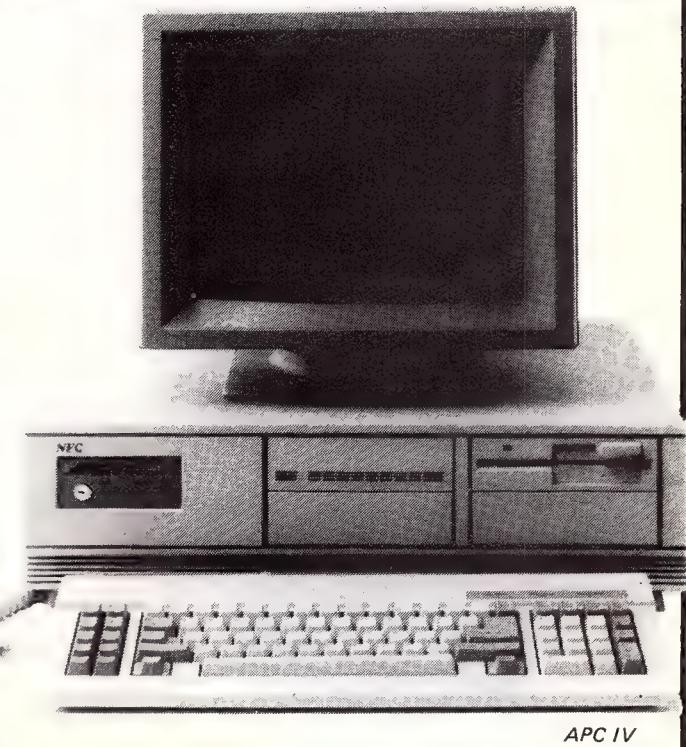
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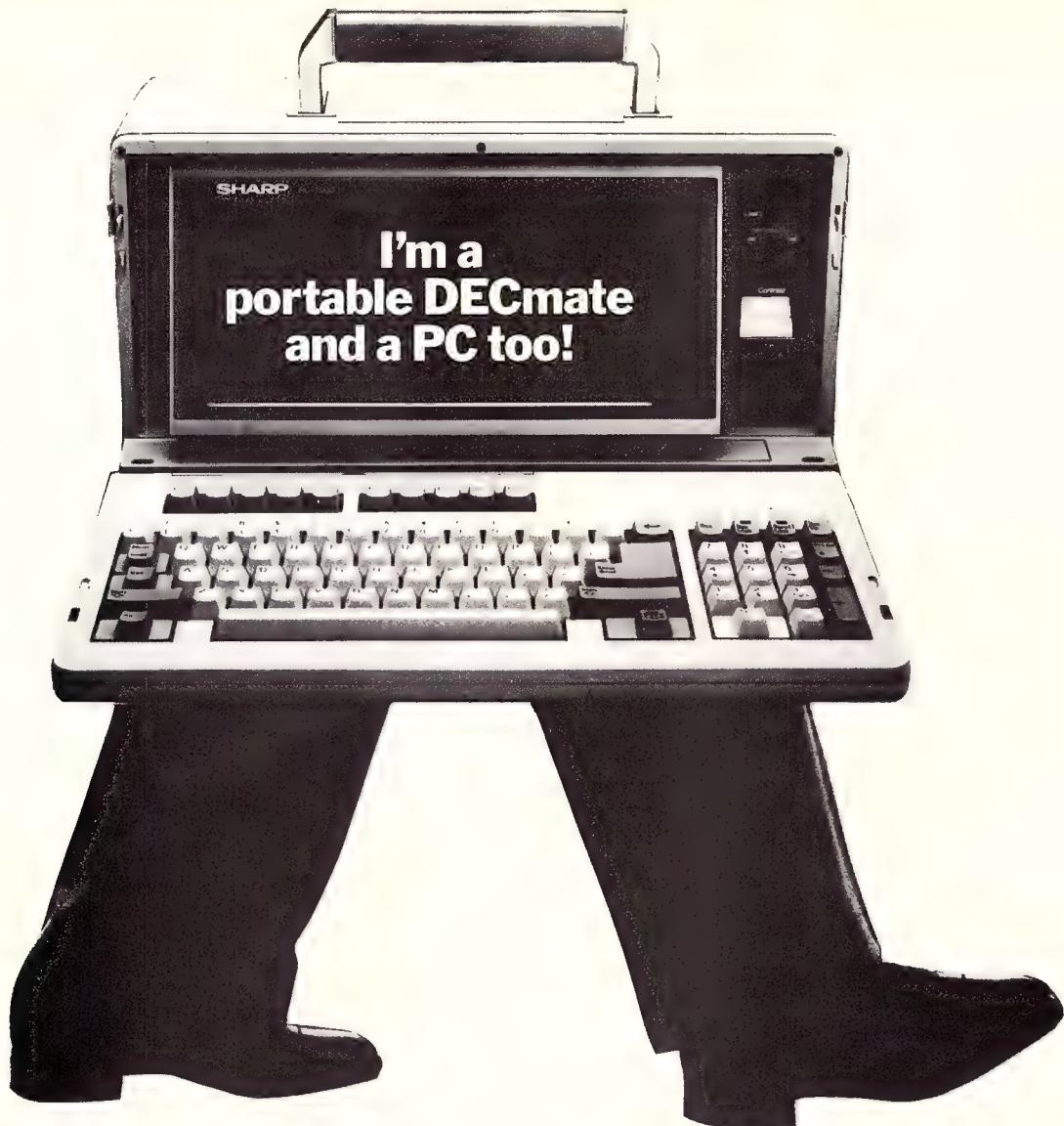
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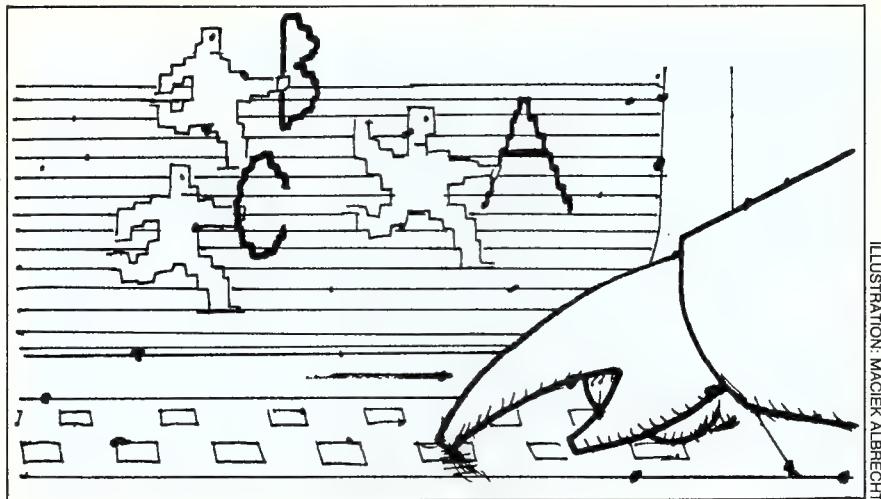
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Accelerated keystrokes



The PC keyboard typically takes half a second to begin repeating a keystroke. Once the autorepeat process has begun, it repeats keystrokes at the rate of 11 a second, taking about seven seconds to move the cursor across the screen. This typematic action is not as quick as it could be.

The assembly language program that is shown in listing 1 (called **KWIKKEY.ASM**) uses the computer's timer and interrupt mechanisms to increase the keyboard's repeat-key rate. This, in turn, decreases the time the user spends waiting for the keyboard to respond to keystrokes. The program can be used with a PC, XT or AT. **KWIKKEY.ASM** is able to accelerate the PC keyboard because of the flexible design of the PC's keystroke handling. The keyboard contains its own Intel 8048 microprocessor. A control program in the ROM of the 8048 controls the processor's actions. This program is responsible for identifying individual keystrokes. It maintains communication with the computer as it serialises data for output.

When a key is pressed (called a *make*), the keyboard sends the computer a scan code, ranging from one to 83; each represents a different key on the keyboard. When a key is

released (called a *break*), the keyboard adds 128 (80H) to the original scan code and sends the resulting code to the computer. For example, the scan code for the Esc key is 1. When Esc is pressed, the keyboard sends a 1 (01H) to the computer; when Esc is released, the keyboard sends a 129 (81H).

When the keyboard senses either a make or a break, it signals the 8259 interrupt controller chip at the PC end of the coiled keyboard cable, to interrupt the action of the CPU. The 8259 then forces an INT 9, which passes control to the KB_INT procedure contained in the ROM BIOS. This routine reads the scan code from the keyboard and responds appropriately.

The KB_INT procedure is very sophisticated. It must handle the cases of Shift, Ctrl, and Alt key combinations, as well as the special commands Shift-PrtSc, Ctrl-Break, Ctrl-NumLock, and Ctrl-Alt-Del. As soon as the keystroke has been interpreted, the KB_INT procedure places an ASCII (or special extended ASCII) value in a circular queue. When a program requests keyboard input, it is passed the first keystroke contained in this buffer.

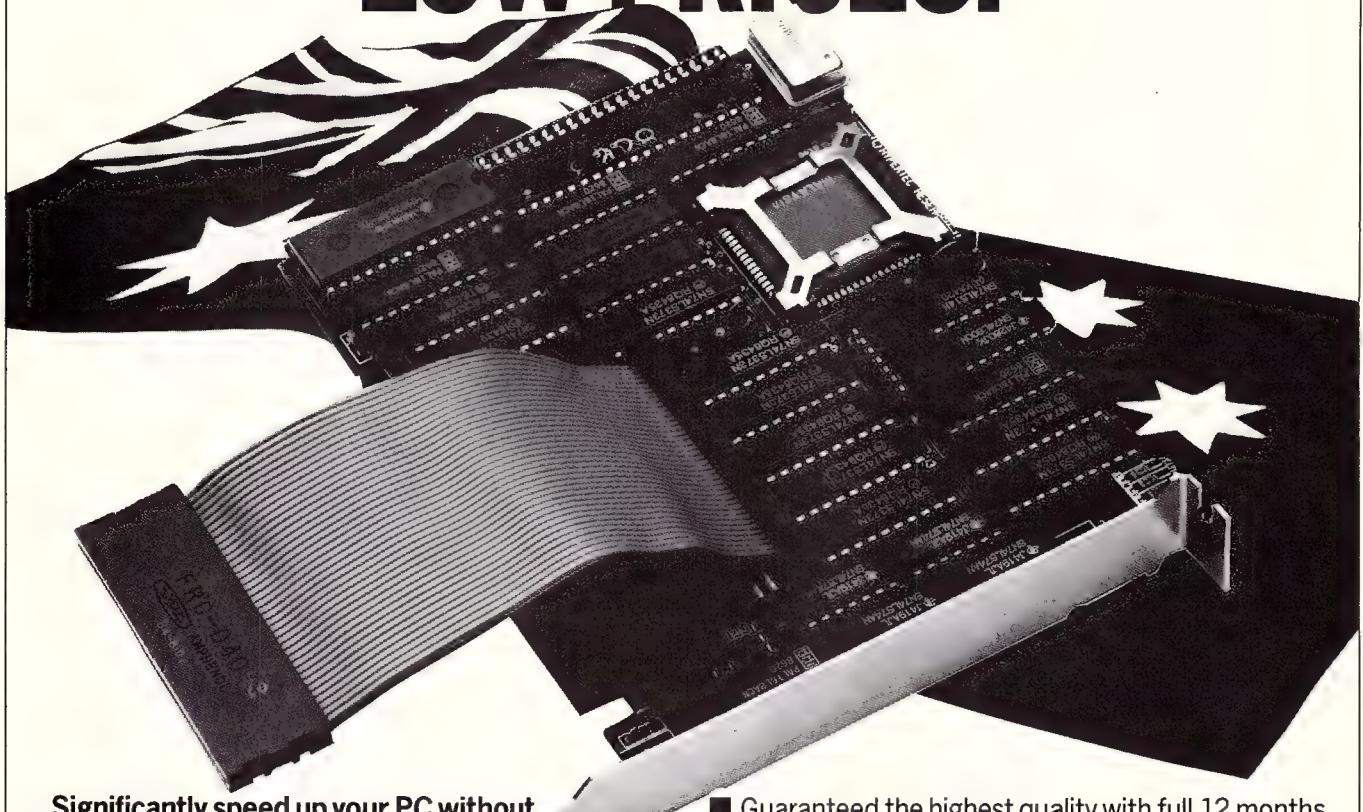
Because of this flexible system, nearly every facet of the PC's keyboard handler can be modified. The

most common way to modify keyboard action is to replace the BIOS KB_INT routine with a custom driver. Several keyboard utilities are available, such as SuperKey from Borland International and ProKey from RoseSoft.

However, simply replacing the BIOS KB_INT routine does not affect the typematic action of the PC keyboard. KB_INT only processes each scan code as it comes from the keyboard. The 8048 processor in the keyboard is responsible for determining how soon to start the repetitions as well as how fast to send them. In much the same way that the keyboard interrupts the CPU when a scan code is ready, the realtime clock also forces hardware interrupts. It does not wait for an external event, such as a keystroke, but interrupts the CPU on a regular cycle, every 55 milliseconds or about 18.2 times a second. The interrupt vector called the timer tick (INT 1CH) can be used to intercept the realtime clock interrupt. Spooler programs and other background tasks often tie into the timer tick in order to do a slice of processing in the background while another program continues running.

KWIKKEY.ASM also uses the timer tick interrupt. The program intercepts both the keyboard interrupt (KBD_INT) and the timer interrupt (TIMER_INT) and makes them work

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together to handle repeat-key actions.

The version of KBD_INT defined in KWIKKEY.ASM monitors the keyboard buffer. When it senses that a keystroke has been recorded, it saves the keystroke in a memory variable. Simultaneously, the TIMER_INT included in KWIKKEY checks continuously to see if a repeat of the keystroke is desired. At the interval specified by the user at the beginning of the program, TIMER_INT stores the saved keystroke in the keyboard buffer, effectively repeating the previous key, long before the keyboard itself would have been able to repeat the key.

The KWIKKEY.ASM program is written as three separate procedures: SET_UP, KBD_INT, and TIMER_INT. When KWIKKEY is executed it jumps over the data and the interrupt handlers to get to the SET_UP procedure, which is the initialisation portion of the program. SET_UP first checks to make sure that a copy of SET_UP has not been installed already.

Any program that intercepts an interrupt risks the possibility of interfering with other programs that perform the same task. To avoid this danger KWIKKEY does not disable the system interrupt handlers. It simply borrows the interrupts temporarily, always passing control down the line to the original interrupt handler. If another timer interrupt handler has been installed, this technique makes sure that the original handler is given its expected time share. If KWIKKEY proves to be incompatible with some already installed program, the answer might be to install KWIKKEY first.

After storing the original keyboard and timer interrupt vectors in its data area, KWIKKEY loads the new KBD_INT and TIMER_INT addresses. The program then uses the INT 27H "terminate-but-stay-resident" service to pass control back to DOS, leaving the interrupt handler code resident in memory.

After both interrupt handlers have been installed, TIMER_INT is executed 18.2 times a second. Thus, its action can be considered continuous and it is executed regardless of any other processes taking place. KBD_INT is executed only when the user presses or releases a key.

When a key is pressed or released, KBD_INT checks the current position of the end of the queue in the keyboard buffer (called the *buffer tail*). (See figure 1 for a diagram of the keyboard buffer.) After checking the buffer tail, KBD_INT then invokes the original keyboard interrupt. Upon returning, it checks the position of the buffer tail again. If the position has changed, it knows that a keystroke has been input in the interval. The new keystroke is saved for handling later by the timer interrupt, and the variable INIT_DELAY is initialised to start the countdown before the first repeat.

KWIKKEY demonstrates the concepts of background tasking and coroutines

Note that the repeat mechanism is disabled in the special case of an artificial keystroke.

However, if the buffer tail has not moved since KBD_INT first checked its position, the interrupt must have been caused by a Shift key combination (which does not produce an ASCII code) or by the release of a key. In either case a keystroke repeat is not necessary and a flag is set to prevent the timer interrupt from taking any action. Any autorepeat in progress is stopped. The interrupted program then is exited via an IRET instruction.

At the same time, the TIMER_INT continues to be executed 18.2 times a second. Its job is to simulate keyboard activity by placing scan codes in the keyboard buffer at appropriate times. It checks the value of the INIT_DELAY variable continuously. If the value is not 0, it decrements it and exits without taking any further action. The effect is that a new keystroke is not repeated until the fifth time that TIMER_INT is executed. Because the timer ticks at a rate of about 55 milliseconds, the keystroke does not begin repeating for about 275 milliseconds (or about a quarter of a second). A longer delay is not necessary; this is plenty of time to allow the user to release the key. A

shorter delay might cause spurious repeats. Users can experiment with this value by changing the REPT_DELAY equate at the beginning of the KWIKKEY.ASM program.

After the quarter second delay, TIMER_INT begins counting down to the time specified at the beginning of KWIKKEY.ASM to put a repeat keystroke in the keyboard buffer. The RATE_DELAY variable is decremented with each subsequent pass. When it reaches 0, the scan code in LAST_KEY is placed in the keyboard buffer. If the buffer is full, no action is taken.

In the program shown in listing 1, the REPT_RATE constant is set at 1, which means that a repeat is forced once every two executions of the TIMER_INT. The user can change this constant to force the repeat to occur at a different interval. TIMER_INT is executed 18 times a second; as a result, nine repeats are added to the 11 that come from the keyboard, for a total of 20 repeats a second. This rate can be changed with the REPT_RATE equate at the beginning of the program.

While the KWIKKEY.ASM program can be used with an AT, a much simpler method also exists for accelerating the reaction time of the AT's keyboard. This is because the AT serial keyboard link is bidirectional. This allows data to be sent directly to the 8048 keyboard controller. As a result, repeat-key action can be augmented with a simple BASIC program called KWIKAT.BAS (see listing 2) or a short assembly language program (see "Rev Up the AT Keyboard," Tech Notebook PC Australia, December 1985).

The KWIKAT.BAS program can be included in an AUTOEXEC.BAT file. KWIKKEY.ASM proves the value of assembly language; it could not have been written in any other language.

KWIKKEY demonstrates the concepts of background tasking and coroutines. While the TIMER_INT and the KBD_INT procedures are useless when examined individually, their dynamic interplay provides a unique software solution to a shortcoming of the PC keyboard.

Dan Rollins is a computer consultant and freelance technical writer.

LISTING 1: KWIKKEY.ASM

```

; KWIKKEY.ASM Version 1.4 5-28-86
; Copyright (c) 1985 by Dan Rollins
;
; This program speeds up the repeat action of the IBM PC and XT
; keyboard. After installation, a keystroke begins repeating about
; 1/4 second after the initial keystroke and the repeats occur at
; about twice the normal speed. These delay and rate parameters may
; be modified. The program uses the 55ms timer interrupt to augment
; the speed of the keyboard. The basic idea is to have the timer
; interrupt check to see if the key has been released. If not, then
; it stuffs a keystroke into the BIOS keyboard buffer. Notes: This
; program must be used with DOS 2.0 or later. It is a COM format
; program, so it must be processed by EXE2BIN.
;
;*** program equates ===

REPT_DELAY equ 5 ;number of 55ms intervals to skip before
; the first repeat. 5 = 275ms = about
; 1/4 second. Use at least 2 to avoid
; "key bounce"

REPT_RATE equ 1 ;Select from: 0 = 29 repeats per second
; 1 = 20 repeats per second
; 2 = 16 repeats per second
; 3 = 13 repeats per second
; 4 or more = standard repeat rate

BIOS_DATA_SEG equ 40h ;These addresses are listed
BUF_START equ 1eh ; in the Technical Reference manual
BUF_END equ 3eh
BUF_HEAD_ADDR equ 1ah
BUF_TAIL_ADDR equ 1ch
ALT_NUM_BUF equ 19h

FALSE equ 0
TRUE equ 1
;
```

```

com_seg segment
assume cs:com_seg, ds:com_seg
org 100h ;must set up for COM file
kwikkey proc far
jmp set_up ;get past the data and install the
;interrupt handlers

;***** program data area *****
delay db REPT_DELAY ;max ticks BEFORE STARTING to repeat
rate db REPT_RATE ;maximum ticks BETWEEN repeats

inst_flag dw 1234h ;KWIKKEY signature when already installed
rep_ok db FALSE ;flag turns off repeat while processing
last_key dw 0 ;stores most recent keyboard scan code
init_delay db REPT_DELAY ;remaining ticks before
;starting to repeat
rate_delay db REPT_RATE ;remaining tick between repeats

bios_kbd_int label dword ;DWORD so it can be used in a FAR call
bki_offset dw 0 ;This is set to the addr of BIOS KB_INT
bki_segment dw 0 ;at the time of installation of KWIKKEY

user_timer_int label dword ;used to preserve "forward chain" of user
uti_offset dw 0 ;timer interrupt handlers. Set in SET_UP
uti_segment dw 0 ;procedure, this addr will normally point
;to an IRET.

;***** KBD_INT *****
;This procedure intercepts keystrokes and sends control to normal
;BIOS KB_INT. Its primary function is to set up for the repeat action
;that occurs in the TIMER_INT. It checks each key that comes in, and
;resets a delay counter if it is a new keystroke.
kbd_int proc far
mov cs:rep_ok, FALSE ;turn off repeats while
;processing
push ax ;save the registers
;
```

```

push si
push ds
mov ax,BIOS_DATA_SEG ;set up to address
mov ds,ax ;BIOS data area
mov si,ds:[BUF_TAIL_ADDR] ;get addr of current
;buffer tail

;check special case: don't repeat ALT-numped keystrokes
cmp byte ptr ds:[ALT_NUM_BUF],0 ;is one in progress?
je ki_10 ;no, continue
pushf ;yes, process
call cs:bios_kbd_int ;the keystroke
jmp ki_exit ;exit with repeats off

ki_10: pushf ;simulate a normal interrupt
call cs:bios_kbd_int ;and process the keystroke

cmp si,ds:[BUF_TAIL_ADDR] ;did the tail move?
jne ki_20 ;no, either a shift-key
;or a release
mov cs:last_key,0 ;insure no spurious repeats
jmp ki_exit ;exit with repeats turned off

ki_20: mov ax,[si] ;get new scan code
cmp ax,cs:[last_key] ;same as last time?
mov cs:[last_key],ax ;(save the key for next time)
je ki_30 ;yes, hardware repeat
;just reset the rate
;no, reset both timer delays
mov al,cs:delay ;get maximum tick count
mov cs:init_delay,al ;set delay before repeat

ki_30: mov al,cs:rate ;get maximum tick value
mov cs:rate_delay,al ;set delay between repeats
mov cs:rep_ok,TRUE ;OK to continue repeating

ki_exit: pop ds
pop si
;
```

```

pop ax
iret ;also restores Flags of interruptee
kbd_int endp

;***** TIMER_INT *****
;This procedure is executed 18.2 times per second
;
;It checks to see if a repeat is needed. If so, it stuffs the scan
;code into the keyboard buffer, ready for the next keystroke request
;
timer_int proc far
cmp cs:[rep_ok],TRUE ;are repeats blocked?
jne ti_exit ;yes, resume without repeat

cmp cs:init_delay,0 ;finished delaying before
;first repeat?
je ti_10 ;yes, check rate delay
dec cs:init_delay ;no, decrement timer
jmp ti_exit ;and resume without repeat

ti_10: cmp cs:rate_delay,0 ;finished delaying between repeats?
je ti_20 ;yes, do the repeat
dec cs:rate_delay ;no, decrement rate timer
jmp ti_exit ;and resume without repeat

;----- repeat the previous keystroke -----
ti_20: push ax ;save all registers used
push si
push ds
mov ax,BIOS_DATA_SEG ;prepare to address BIOS data area
mov ds,ax
mov ax,ds:[BUF_TAIL_ADDR] ;get current position
;in kbd buffer
mov si,ax ;we'll need this address later
add si,2 ;point to next position in buffer
;
```

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```

        cmp    ax,BUF_END      ;past end of buffer?
        jne    ti_30          ; no, continue
        mov    ax,BUF_START    ; yes, next position is the
                                ; start

ti_30:
        cmp    ax,ds:[BUF_HEAD_ADDR] ;if tail=head, buffer is full
        je     ti_40          ;full, continue without repeat
        cli
        mov    ds:[BUF_TAIL_ADDR],ax ;not full, don't allow break-in
        mov    ax,cs:[last_key]    ; update buffer position
        mov    [si],ax           ; fetch key to repeat
        mov    [si],ax           ; store key in buffer
        sti
        ; interrupts ok now

ti_40:
        mov    al,cs:rate      ;get the max rate delay value
        mov    cs:rate_delay,al ;don't repeat for a while
        pop    ds
        pop    si
        pop    ax
        ; restore registers
        ; and exit

ti_exit:
        jmp   cs:[user_timer_int] ;continue with previously
                                ;installed interrupt handler
        timer_int endp

LAST_BYTE equ  offset $+1 ;this is the address passed to INT 27H
                        ; Notice that the code of the SET_UP
                        ; procedure does not need to be preserved

;-----  

; SET_UP
; This routine is executed only once -- when the program is installed.
;  

; It resets the vectors of the KBD_INT and the USER_TIMER_INT,
; pointing them to code within this program. Note that the original
; vectors are saved and executed so all previously-installed interrupt
; handlers remain operational.

logo_msg db 201, 25 dup(205),187,0dh,0ah
        db 186,!      ;KWIKEY Ver. 1.4  '1,186,0dh,0ah
        db 186,!      ;(c) 1986 by Dan Rollins ',186,0dh,0ah
        db 200, 25 dup(205),188,0dh,0ah,'$'

err_msg db 'Error: 1,07,KWIKEY already installed',0dh,0ah,'$'

set_up proc near
;----- first, make sure KWIKEY hasn't been installed ...
        mov    al,9
        mov    ah,35h        ;DOS GET_VECTOR service
        int   21h          ; for interrupt 9

        cmp   es:inst_flag,1234h ;has KWIKEY been installed?
        jne   su_10          ; no, continue
        mov   dx,offset err_msg ; yes, display
        mov   ah,9            ;      error
        int   21h          ;      message
        int   20h          ;and exit to DOS

su_10:
        mov   al,9            ;get original vector of keyboard int 9
        mov   ah,35h        ;DOS GET_VECTOR service
        int   21h
        mov   bki_segment,es ;save original address
        mov   *bki_offset,bx ; so we can resume normally
                            ; after intercept
        mov   dx,offset kbd_int
        mov   al,9            ;set vector for INT 9
        mov   ah,25h        ;DOS SET_VECTOR service
        int   21h

        mov   al,1ch          ;the user timer interrupt
        mov   ah,35h        ;DOS GET_VECTOR service
        int   21h
        mov   uti_segment,es ;save old address
        mov   uti_offset,bx ; so we don't hog the timer interrupt

        mov   dx,offset timer_int
        mov   al,1ch          ;set vector to point to new TIMER_INT
        mov   ah,25h        ;DOS SET_VECTOR service
        int   21h

;----- display logo to indicate installation complete
        mov   dx,offset logo_msg

```

```

        mov   ah,9
        int   21h

        mov   cs:rep_ok,TRUE ; it's OK to start repeat action

;----- exit to DOS, leaving the interrupt handlers resident
        mov   dx,LAST_BYTE
        int   27h

set_up endp
kwikey endp
com_seg ends
end   kwikey      ;must specify for COM-format file

```

LISTING 2: KWIKEY.BAS

```

0 /* AT keyboard repeat speedup sets the delay and repeat
1 /* then prints the values according to formulas found
2 /* in the AT Technical Reference
3 /*
4 /* The programming sequence is as follows: first output a command
5 /* (OF3h) then output a delay-and-rate value. Bits 5 and 6 control
6 /* the delay ranging from 250 ms up to 1 second. Bits 0 through 4
7 /* identify the repeat rate, ranging from about 30 repeats per
8 /* second to 2 repeats per second.
9 /*
10 PRINT " AT keyboard speedup"
11 PRINT "=low values are fastest="
20 INPUT "Initial delay (0-3): ",ID
30 INPUT "Repeat rate (0-31): ",RR
40 OUT &H60,&Hf3 :OUT &H60,(ID*32)OR RR
45 *** All set. Now calculate speed.
50 PRINT "initial delay is";
60 PRINT (ID+1) * .25;"seconds"
70 A=(RR AND 7) :B=(RR AND 24)\8
80 P=(B+A) * (2^B) * .00417
90 PRINT "repeat rate is";
95 PRINT 1/P;"per second"

```

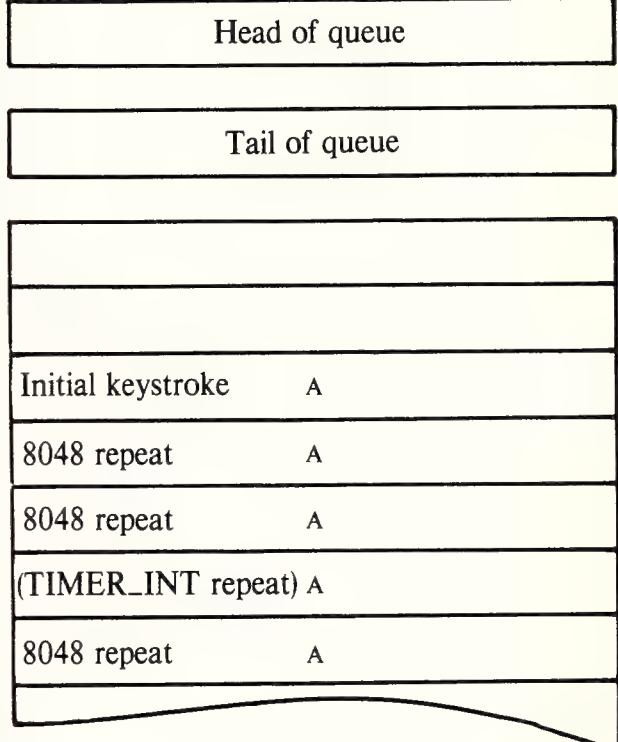


Figure 1: Keyboard buffer

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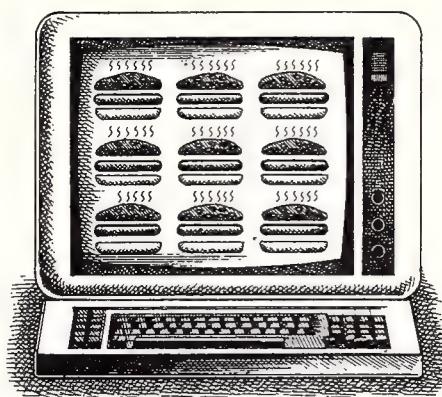
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- It is the embodiment of many man/woman-years of intellectual effort, ingenuity and considerable expense; a commercial and ethical point which many of you conveniently ignore when breaking your copyright agreement.
- It is a productivity tool which is designed to maximise your return on the not insubstantial outlay for hardware and software and it takes a substantial investment of your time and thus money to acquire the skill to efficiently use it. This investment entails a considerable amount of time (typically one to six months) and may also include external training courses.
- It entails an emotional commitment (rational or irrational) to the tool born out of either satisfaction with using the tool or long frustration in pounding it to your purpose or a combination of both. Let us term this 'software neurosis'.
- Finally, software includes doubtful after-sales service and support and a warranty which is more interested in disclaiming any responsibility.

Enter the microwave

Recently, my wife and I decided we would do our yearly bit for consumerism and the economy so we set off to buy a microwave oven.

Having been assaulted and insulted by many a microwave oven salesman, we settled on a cheap Japanese clone of our Aussie camp oven for the princely sum of \$450. This was a big family outlay — even my sons had



chipped in with their piggy banks.

The microwave oven has a few characteristics of its own:

- It is not cheap. It comes in a rather large box (which my wife instantly purloined) and the object itself is very tangible. You can easily see your \$450 worth and impress the Jones's.
- It is the embodiment of many man/woman-years of intellectual effort, ingenuity and considerable expense. Unlike software, copying a microwave oven demands much more perserverance.
- It is a productivity tool; it cooks fast. The fuel stove has been a little neglected since its high-tech mate arrived. As soon as we worked out where to put the oven — a non-trivial task in a country kitchen with a mind of its own — it was warm cocoa all round and, for afternoon tea, our first microwaved cake. Instant productivity with a telescoped learning curve.
- It requires an emotional commitment to the tool born out of complete satisfaction; evangelical describes my wife's feelings toward her rebirth into the microwave life.
- Finally, the after-sales service and support are second to none. It has got a small scratch on the underside of the rear of the door handle! No problem sir, we will send you a replacement by helicopter within the day! Twelve months warranty, a formalised service and support department Australia-wide, and the potential big stick provided by a consumer's bureau to vent any grievances, ensure that the

supplier performs.

Software versus microwave

The contrast between our microwave oven and PC software is most pronounced in the arena of after-sales service and support. When you combine the paucity and often patronising nature of software support ("It works fine on my machine — what's YOUR problem") with the user's software neurosis, a great deal of aggressive vibrations are generated. Why?

First, software is a potential product. It can generate complex problems as a result of unknown system bugs, interactions with your PC's operating environment and a myriad of other factors, least of which is human. Thus trying to reproduce your particular problem over a phone to a very suspicious used-car-salesman-cum-software-expert is fraught with problems.

How supportable is the software? Is the source code for the product available to the agency supporting the product? Rarely. A serious problem usually provokes the, "We'll have to call the States" knee-jerk response, at which point you know you are really on your own! Most of the major software products have at best two local distributors. Thus, there is an imposed monopoly on software support and they know they have a monopoly, so you do not want to ruffle their feathers or it is goodbye support.

A very valuable tip is, when you buy software from your local dealer, look out for the distributor's sticker on the packaging. It is usually on the outer wrapper which you gleefully fling in the bin during your software honeymoon. When the divorce is pending, your dealer, who happily took his 30 per cent cut (ostensibly to support the end user), cannot help and suggests you call the distributor. You will then find you are a software leper, until one of the distributors owns up to supplying your particular registered copy.

The quality of the software support is generally at the "Oh well, we'll have to replace it" level, which means that if

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PC ESSAY

it is beyond the complexity of the 'getting started' chapter, then you have got to return your complete copy to have it replaced, which may or may not fix the problem. Appalling! There is no competition in this non-market, you either like it or lump it.

Dealers cannot practically support the large range of software they supply. Their margins are thinning as discounting increases and the cost of maintaining the range of expertise on staff is prohibitive. Software support is in dire straits in this country. I only wish I could go out and buy microwaved software.

Improvement possibilities

Having said all this, I guess I should now offer some practical suggestions for positive change. First I would like to see the emergence of contract software support bureaus; consulting firms which maintain in-house a wide range of software expertise and market this to software dealers. (The Computer Trader in Melbourne has adopted this approach and having used it a number of times I am relieved and impressed). A variant of this is third-party PAID software support, where the end-user pays a periodic or sessional fee for software support to a third-party support bureau. This approach has worked in the US and offers a promising business opportunity here.

Another requirement is education of software consumers, aimed at making them more aware of the issues involved. This article and magazines such as PC Australia are a start. Similarly, a software 'watchdog' organisation — a Choice/ACA operation for Australian software users — has definite potential.

Greater competition for software support and after-sales support would also help the situation. If consumers purchased software with support and after-sales service as first priority, the state of play would be dramatically different. Users must demand better support and become far more critical.

Well, having said my piece I am going to console myself with a hot toddy, gently warmed in my well loved and expertly-supported microwave oven.

Bill Fitzgerald is a Queanbeyan-based statistician and computing consultant.

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subtract six months from the system date when the system month is March (which is month 3).

We found however that if you extract the day, month and year and store them as numeric memory variables, subtract or add the appropriate days or months, then concatenate those values with all the backslashes into a string variable and convert that string back to a date field, the date will be adjusted appropriately.

For example, if we end up with a string field containing the following value '12/3/86' (DD/MM/YY), and then convert that string into a date field, dBase will do the rest by calculating the date to be 19/08/85.

John Stefanac and Tricia Elkington
Mt Waverley, Vic.

I am sure John and Tricia are not the only people to have this requirement. The suggested procedure is very pleasing indeed. As an implementation example refer to the program in Listing 1.

*DATECALC.PRG 16/07/86 dBASE III plus command file
* Purpose — To add or subtract days or months from a given date.
* Note: ensure a SET DATE BRITISH has been executed!

parameters DATE, DAYS, MONTHS, RESULTDATE

*DATE — The start or source date
*DAYS — The number of days to be added (may be negative)
*MONTHS — The number of months to be added (may be negative)
*RESULTDATE — The resultant date to be passed back
* Call example: do DATECALC with ctod('02/03/86'), -14, -6, TEMPDATE
* will result in TEMPDATE containing 19/08/85 — a date 6 months
* and two weeks prior.

private all like P*

store ltrim (str(day(DATE) + DAYS)) to PDAY
store ltrim (str(month(DATE) + MONTHS)) to PMONTH
store ltrim (str(year(DATE))) to PYEAR

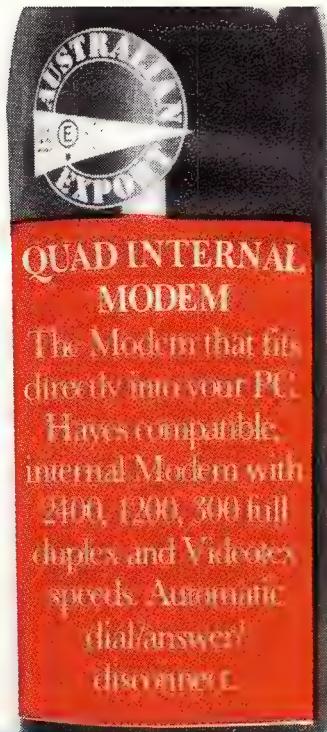
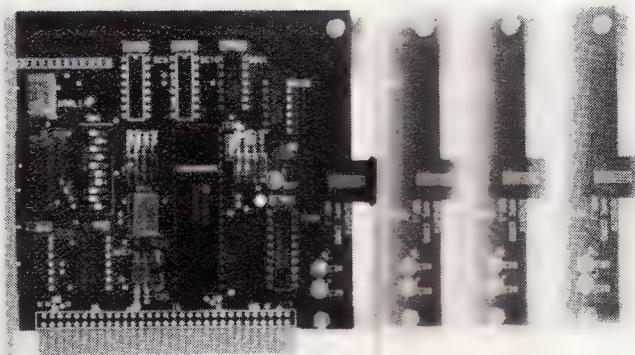
store PDAY + '/' + PMONTH + '/' + PYEAR to PDATE
store ctod(PDATE) to RESULTDATE

Return

Listing 1: A simple date manipulation routine for dBase.



Disappearing act



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A cursory glance

The debug session used to create CURSOR.COM, shown below allows you to change your cursor attributes.

This program takes two arguments — each a two digit hexadecimal number — to specify the top scan line and bottom scan line of the cursor. Try

```
DEBUG
-A
XXXX:0100 MOV AX,[005D]
XXXX:0103 CALL 0116
XXXX:0106 MOV CH,AL
XXXX:0108 MOV AX,[006D]
XXXX:010B CALL 0116
XXXX:010E MOV CL, AL
XXXX:0110 MOV AH,01
XXXX:0112 INT 10
XXXX:0114 INT 20
XXXX:0116 CALL 0125
XXXX:0119 XCHG AL,AH
XXXX:011B CALL 0125
XXXX:011E MOV CL,04
```

CURSOR 00 0C as a starter and experiment with other values.

S. Reid

Getting bored looking at the same old cursor? If so this program may brighten up your day! Note that some programs may reset the cursor back to the normal blinking underline.

```
XXXX:0120 SH AH,CL
XXXX:0122 ADD AL,AH
XXXX:0124 RET
XXXX:0125 OR AL,20
XXXX:0127 SUB AL,57
XXXX:0129 JNB 012D
XXXX:012B ADD AL,27
XXXX:012D RET
XXXX:012E
-N CURSOR.COM
-R CX
CX 0000
:002E
-W
Writing 002E bytes
-Q
```

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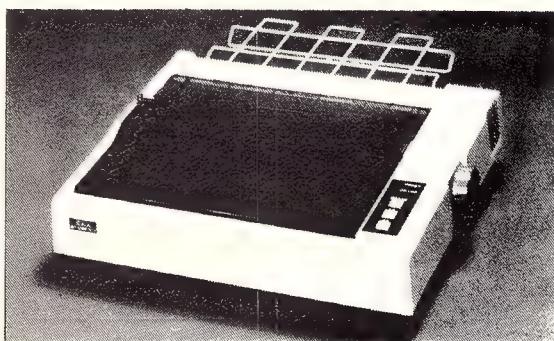
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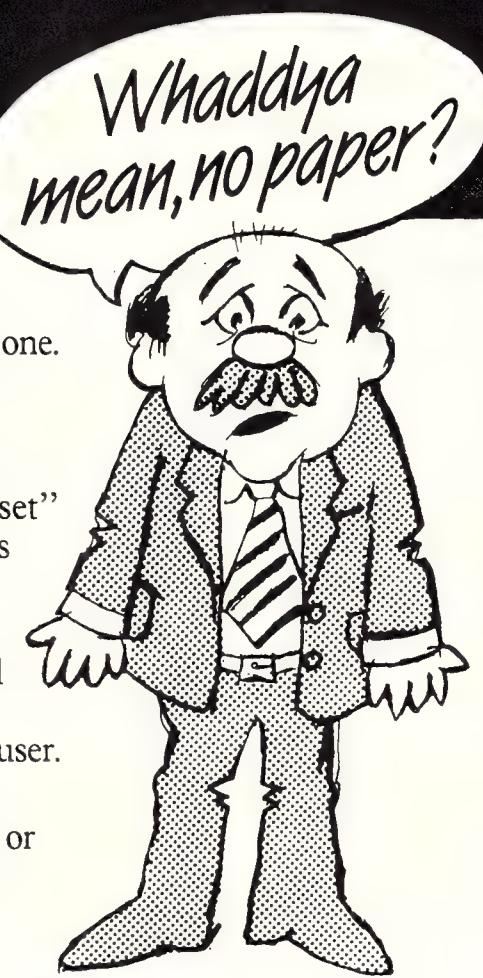
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Sorting out DOS

As users of IBM PCs and compatibles we all have one thing in common — our disk operating system, or DOS. Whether it be PC-DOS, MS-DOS, TeleDOS or one of a hundred other variants, we all have to, at one stage or another, grapple with DOS. In response to the increasing number of letters received on this subject, we are introducing this new column, by Mike Olsson, from the Technical Support staff of Microsoft's Australian subsidiary.

Three queries

I am using MS-DOS 1.25 on a Columbia PC, which includes a RAM-disk that is installed using DEFINE.COM. Having upgraded the memory to 640K, I find that the RAM-disk works with Perfect Writer, but not with BASICA. Is there any way I can patch MS-DOS to get it working?

Having been frustrated with MS-DOS 1.25, I purchased a copy of MS-DOS 2.11 for the Olivetti, which runs like a charm until I want to print something. In order to get COMMAND.COM to recognise that I have a US keyboard, I have to type in Ctrl-Alt-F1, which can get annoying. Is there anything I can do about it?

Barry Wilson
Warrnambool, Vic.

I must admit to having no experience with Columbias, or the peculiarities of the Columbia MS-DOS implementation. It is worth making the point that each implementation of DOS is different, and is customised by the hardware manufacturer.

Several factors may be affecting your attempts to use the RAM-disk with BASICA. First of all this version of MS-DOS is ancient and second, BASICA may be loading itself on top of the RAM-disk memory. It is certainly possible to load files from and save to a RAM-disk, since it appears to applications as a normal disk drive. I have verified that this works on an NCR PC8 running MS-DOS 3.1 using an AST Rampage board with a 1.5M RAM-disk. It therefore appears that your problems may well be related to the particular implementations of MS-DOS and/or BASICA, both of which are machine-specific.

Furthermore, if you expect BASICA to directly address the extra memory you are out of luck, because it is limited to 64K.

There is nothing you can do about the Olivetti MS-DOS and the necessity to press Ctrl-Alt-F1 to get it to recognise the US keyboard because the problem is machine-specific.

Attempting Re-entry

I will be writing an interrupt handler that performs DOS (INT 21H) calls for file I/O, and I believe that DOS is supposedly non-re-entrant. If this is the case, is there a flag or some way to tell if it is safe to perform DOS functions? I had considered intercepting INT 21H, but I don't think this is required or satisfactory. I've seen the way that Windows does it, but I need something foolproof! I have noticed that Sidekick and other programs sometimes beep, possibly because a DOS routine is active.

Dennis Bareis
Viatel No. 355788760

There is no safe way for an interrupt handler to perform disk I/O, as DOS does not set flags or use any other method to indicate that disk I/O is in progress.

There may well be ways that an interrupt handler can determine if disk I/O is in progress, but they would be

'coincidental' and not documented.

There are very good reasons for not doing disk I/O from an interrupt handler, not the least of which is that when a new version of DOS appears, your program is almost certain to be incompatible if it makes use of undocumented aspects. Another reason is that the use of such undocumented aspects of DOS may well make the program incompatible with other software. There is typically no way to determine such compatibility between software other than running it and seeing if it works.

Finally, if it is the case that your program makes incorrect assumptions about the state of DOS when your interrupt handler was invoked, it could well do substantial damage to the disk, and you may not find out until too late.

A recent conference in Seattle involving Microsoft and other software developers (such as Borland which makes use of these techniques in Sidekick) was aimed at establishing standards for such memory-resident software, whether it be an interrupt handler like the one described or a full-blown package such as Sidekick. No clear and comprehensive recommendations have been made although such standards are likely to be laid down in the future. ■

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Using ROM characters

James Parsly shows how the PC character display data in ROM can be used to print in a variety of ways.

Characters can be printed at any point in the 640-by-200 high-resolution graphics grid. A pattern table for the first 128 ASCII codes is found at location F000:FA6E in ROM. Each pattern consists of eight bytes representing the rows of dots that make up a character. In high-resolution graphics, the ROM BIOS displays characters by copying the appropriate bytes from the pattern table into video RAM.

The BASIC program called GLABEL.BAS (see below) contains three subroutines that use this table for enhanced character displays. The first routine prints characters

anywhere on the 640-by-200 high-resolution graphics grid and can be used for labeling tic marks. The second routine prints double-width characters similar to the ones that are possible with medium-resolution graphics. It can be used to label plot titles. The third routine prints characters rotated by 90 degrees and is useful for labeling y-axis titles. The main program offers a demonstration of the three routines. ■

* James Parsly is a systems analyst

LISTING 1: GLABEL.BAS

```

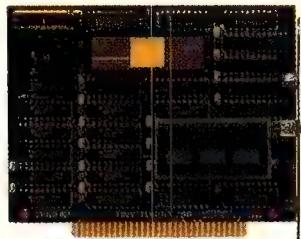
10 SCREEN 2:KEY OFF:CLS
20 REM
30 REM  DEMONSTRATE VERTICAL RESOLUTION
40 REM
50 X=0:FOR Y = 7 TO 20:L$=CHR$(Y+58):GOSUB 400
90 X=X+8
95 NEXT Y
100 REM
120 REM  DEMONSTRATE HORIZONTAL RESOLUTION
130 REM
140 Y = 60:FOR X = 65 TO 75:L$=CHR$(X):GOSUB 400
170 Y = Y + 8
175 NEXT X
180 REM
200 REM  DEMONSTRATE LARGE LETTERS
210 REM
220 Y=80:A$="BIG LETTERS"
230 FOR I = 1 TO LEN(A$)
250 X = 150+I*16:L$=MID$(A$,I,1)
260 GOSUB 690
280 NEXT I
290 REM
300 REM  DEMONSTRATE 90 DEGREE ROTATION
310 REM
320 A$="90 DEGREE ROTATION":X = 400
330 FOR I = 1 TO LEN(A$)
350 Y = 200-I*8:L$=MID$(A$,I,1)
360 GOSUB 870
380 NEXT I
390 LOCATE 20,1:STOP
400 REM
410 REM  SUBROUTINE PRINTS A LETTER L$ WHOSE LOWER LEFT-HAND CORNER
420 REM  WILL BE LOCATED AT (X,Y).
430 REM
440 IF ASC(L$) > 127 THEN RETURN
450 XX = X MOD 640:IF XX < 0 THEN XX = XX + 640  'MAKE 0 <= XX <= 639
460 REM
470 REM  UNLESS (X MOD 8) = 0, PARTS OF THE LETTER WILL BE IN TWO
480 REM  DIFFERENT COLUMNS.
490 REM
500 SHIFT = 2^(8-(XX MOD 8))  'USED TO SHIFT BITS
510 LL = INT(XX/8)  '1ST COLUMN
520 MM = (LL+1) MOD 80  '2ND COLUMN
530 FOR II=Y-7 TO Y  'ROW LOOP
540 YY = II MOD 200:IF YY < 0 THEN YY = YY + 200  'MAKE 0 <= YY <= 100
550 DEF SEG = &HF000  'SEGMENT OF ROM

```

```

560 REM
570 REM  GET A BYTE REPRESENTING ONE OF THE EIGHT ROWS OF DOTS THAT
580 REM  MAKE UP THE CHARACTER. SHIFT THE VALUE SO THAT THE BITS
590 REM  THAT GO IN THE TWO COLUMNS ARE SEPARATED INTO SEPARATE BYTES
600 REM
610 KK = PEEK(&HF46E+ASC(L$)*8+II-Y+7)*SHIFT
620 DEF SEG = &HB800  'SEGMENT FOR VIDEO
630 IF YY MOD 2 = 0 THEN DISP=0 ELSE DISP = &H2000 'OFF. FR EVN/ODD ROWS
640 MM = INT(YY/2)*80  'OFFSET TO ROW
650 POKE DISP+MM+LL,PEEK(DISP+MM+LL) OR INT(KK/256) 'SET BITS IN 1ST COL
660 POKE DISP+MM+NN,PEEK(DISP+MM+NN) OR (KK-INT(KK/256)*256)  '& 2ND COL
670 NEXT II
680 RETURN
690 REM
700 REM  SUBROUTINE PRINTS A DOUBLE-WIDTH CHARACTER L$ WHOSE
710 REM  LOWER LEFT-HAND CORNER IS (X,Y)
720 REM
730 IF ASC(L$) > 127 THEN RETURN
740 DEF SEG = &HF000  'SEGMENT OF ROM
750 FOR II = Y-7 TO Y  'ROW LOOP
760 XX = X MOD 640:IF XX < 0 THEN XX = XX + 640  'MAKE 0 <= XX <= 639
770 YY = II MOD 200:IF YY < 0 THEN YY=YY+200  'MAKE 0 <= YY <= 199
780 KK = PEEK(&HF46E+ASC(L$)*8+II-Y+7)  'GET PATTERN FOR A ROW
790 FOR LL=1 TO 8  'LOOK AT BITS IN THE PATTERN
800 MM = KK MOD 2  'GET LAST BIT
810 NN=XX+16-2*LL
820 IF MM <> 0 THEN PSET(NN MOD 640,YY):PSET((NN+1) MOD 640,YY) '2 DOTS
830 KK = INT(KK/2)  'SHIFT BITS RIGHT
840 NEXT LL
850 NEXT II
860 RETURN
870 REM
880 REM  SUBROUTINE PRINTS A CHARACTER L$ WHICH HAS BEEN ROTATED
890 REM  90 DEGREES AROUND ITS LOWER LEFT-HAND CORNER (X,Y).
900 REM
910 IF ASC(L$) > 127 THEN RETURN
920 DEF SEG = &HF000  'ROMS SEGMENT
930 FOR II = 1 TO 8  'ROW LOOP
940 KK = PEEK(&HF46E+ASC(L$)*8+II-1)  'GET PATTERN FOR A ROW
950 FOR LL=1 TO 8  'COLUMN LOOP
960 MM = KK MOD 2  'GET LAST BIT
970 NN=(X-16+2*II-1) MOD 640:IF NN < 0 THEN NN=NN+640  'GET X COOR.
980 YY = (Y-8+LL) MOD 200:IF YY < 0 THEN YY = YY + 200 'GET Y COOR.
990 IF MM <> 0 THEN PSET(NN,YY):PSET(NN+1,YY)  'MAKE TWO DOTS
1000 KK = INT(KK/2)  'SHIFT BITS RIGHT
1010 NEXT LL
1020 NEXT II
1030 RETURN

```



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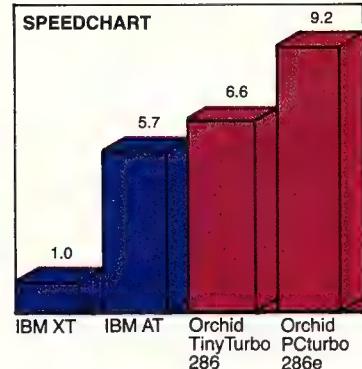
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Shopping at an oasis

Imagine it is midnight. Suddenly you realise you need a packet of floppy disks and you do not have time to go shopping the next day. What do you do?

If you know about the computerised shopping system on PC Oasis BBS # 1 or # 2 you just dial it up and place your order. Within one or two days it will be delivered to your door. Using either of the PC Oasis BBSs you can order computer accessories, controller cards, floppy disks, integrated circuits, printer accessories, power supplies, stationery, disk filing boxes and monitors. All products are covered by the manufacturers' warranty. At the shopping subsystem menu you obtain information on modem shopping by typing **(I)**, list available products with **(L)**, read about a product with **(R)** and place an order with **(O)**. Do not be afraid to check out the sales area. You are able to abort an order at any time.

Alan Williamson, 17, and 24-year-old Craig Stuart started the two BBSs because they saw a definite need in the computing community.

"The sales system came about because on a BBS everyone who calls in is a computer user. Computer users need supplies like paper and diskettes in particular," says Williamson. "A number of the BBS users are office workers or students. When they come home after hours, when they normally couldn't get to a computer shop, they can log onto either PC Oasis and have what they want delivered promptly. With a small profit for the BBS that's great. It helps them and it helps us at the same time."

Williamson and Stuart believe that initially there will be resistance from some BBS users but they predict that when people get used to the idea it will be recognised as very efficient and very useful. A catalogue and price list are available for downloading in the files transfer area — they appear under CATALOG and PRICE.LST — or they can be posted to you.

PC Oasis # 1 started on May 10, 1986 followed by PC Oasis # 2 on May 24. Williamson and Stuart have been friends for more than three years since

they met at a Challenger Users Group. Williamson is a full-time student at the Royal Melbourne Institute of Technology, doing a lead-up to a Computer Sciences course. He wrote the modules for the sales system and the quiz section on the BBS software. Stuart is a computer technician with more than five years experience of repairs and maintenance.

Logging on to either BBS you soon realise that the two sysops are very willing to share their specialised knowledge. One of the many interesting innovations is the Technical Notes in the File Directory area. If you are desperately seeking guidance on such arcane topics as "IBM XT Keyboard Problems", "Problems with Olivetti M24 and M21" or how to unprotect a certain piece of software you are likely to find it here.

Most of the messages appear to come from tertiary students and BBS "junkies" who travel the boards seeking friendship, a chat or advice. I believe you can measure the real value of a BBS by the amount of information about other BBSs which you see in the message area. These two are packed with news and updates on BBS developments each time I call.

Between 25 and 30 users log on each weekday for an average of 35 minutes a call. At the weekend there are 30 to 35 calls on each BBS. There are around 280 registered users on each BBS and only about two per cent are women.

PC Oasis # 1 IBBS hardware is a Pantek PC, with 640K of RAM on the motherboard, two disk drives, 10M Seagate hard disk with DTC controller card, two serial ports, one parallel port, Roland MA121 color monitor, Gemini 15XI dot matrix 120CPS printer, a Smith-Corona Daisy Wheel printer and an Avtek Multi Modem.

PC Oasis # 2 runs on a no-name Taiwanese PC clone with 640K RAM, two disk drives, 16M Daneva hard disk with DTC controller, a multifunction card with realtime clock, serial, parallel and games port, color graphics board, MX80 printer, a Mitsubishi RGB color monitor and another Avtek Multi Modem. ■

PC-Oasis #1 and #2



Sysops: Alan Williamson (#1), Craig Stuart (#2)

Phone: #1 (03) 848-3331; #2 (03) 898-3922

Hours of operation: 24

Baud rate: 300 full duplex

Protocol: 8 Data bits, 1 Stop bit, No parity

Access: Open system.

Registration: Not required.

Password: Allocate your own the first time you log on.

Time limit: Users have 60 minutes a day. All calls which start during prime time (6pm to midnight) have two minutes debited for each real minute connected.

Files for downloading: Over 320 on each system, 70 per cent for IBM PC and compatibles. Many of the PC files have been ARced. A wide selection of utilities, games and public domain programs.

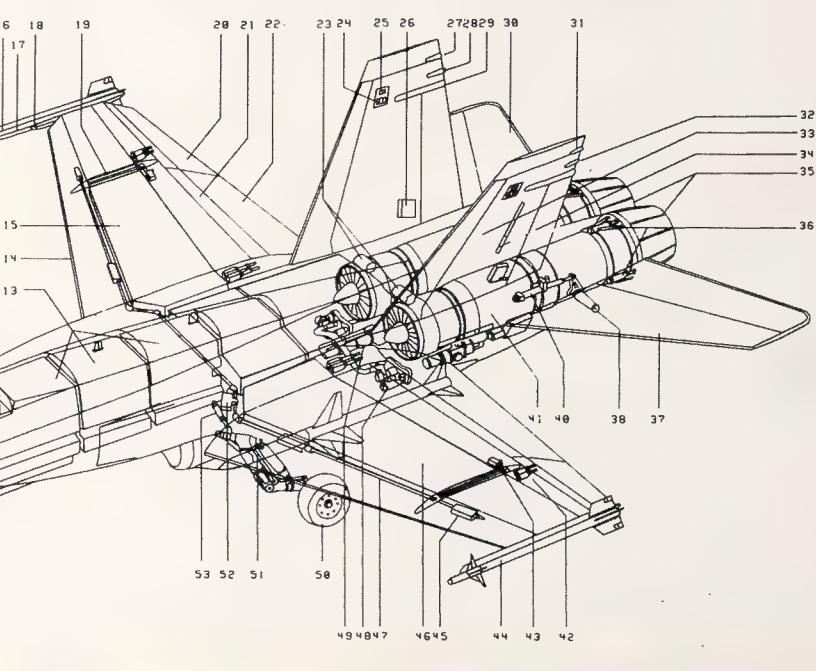
Comments: The two BBSs benefit from the sysops' combined talents. Ideas (and downloadable files) move between the two boards with lightning speed. Although new the PC Oases are no mirage among the more innovative BBSs.

Software used: IBBS V4.03G, written by Gene Plantz of System Software Service (USA), with major modification adding another two modules, one for the sales system and another for the quiz section.

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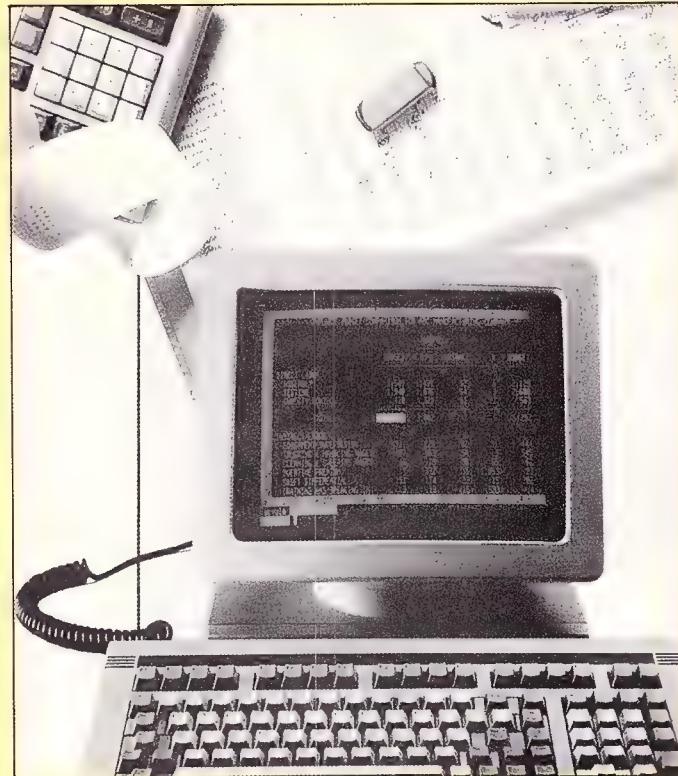
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Fast financial software



New software is available for the Pick AT and XT compatible

Two new software programs for use on the Pick AT and XT compatible have been released by systems and software house, KSH.

CompuSheet Plus, an electronic spreadsheet package and AccuPlot, a graphics software package, are aimed at the business and management markets. CompuSheet Plus provides capabilities for users requiring financial management information at speed. It can be used for projections, cash flow analysis, financial statement preparation, sales proposals, budget and profitability analysis, estimate and asset and depreciation schedules.

This program provides a 1000 column by 10,000 row spreadsheet size. It can integrate with existing applications, allowing the user to retrieve data from any file in the database and place that information on the spreadsheet.

CompuSheet also incorporates a simplified command structure that requires less keystrokes and permits the user to assign any key to a command. The AccuPlot software transforms figures into comprehensive charts and graphs, from simple bar, line and pie charts to detailed stacked bar graphs, scatter diagrams and pie charts with highlighted segments. It supports the new low cost flatbed plotters such as Hewlett-Packard, Hitachi and Tektronics and most models of graphics terminals. Special hardware can be added for color and presentation graphics.

CompuSheet for the XT costs \$640 and \$995 for the AT. AccuPlot for the XT is \$640 and \$740 for the AT.

*KSH Systems,
1155 Malvern Road,
Malvern VIC 3144
(03) 209 2266*

Getting down to business

Scitec has announced the availability of its Business Olympic modem which provides a wide range of baud rates to enable user access to services available through the public telephone network such as Videotex, bulletin boards and data bases.

It allows 300 bps full duplex, 75/1200 bps, 1200 bps full duplex and 2400 full duplex communications. Its features are CCITT V21, V22, V23 bis compatibility, Bell 103, 212A compatibility, auto dial (Hayes AT command set, V25 bis CRN command), auto speed selec-

tion, auto speed recognition, auto adaptive equalisation, pulse or tone dialing, auto data format selection and PSTN or two wire leased line operation.

The modem also has terminal controlled disconnect capability, an in-built speaker for call progress monitoring, powerful diagnostics and terminal compatibility controls. Security features and a telephone handset are optional. The unit is available in stand-alone model or in a high density rack-mountable configuration.

*Scitec,
3 Apollo Place,
Lane Cove NSW 2066
(02) 428 9555*



Scitec's modem with a wide range of baud rates.

Job costing and estimation

Wollongong's Micronet systems has designed a job costing and estimating system to meet the needs of a wide range of companies, from a small service shop to a comprehensive project management company. MJC integrates with the Micronet distribution system (MDS), the Micronet creditors system (MCL) and the Micronet general ledger system (MGL). It can also be used as a stand-alone package.

The reporting feature can produce usage and profitability reports for each job by customer, job number or status. Costs can be compared against budget estimates for analysis.

Detailed job analysis of profitability, usage and provision for job cost versus estimate cost comparisons can also be produced.

MJC allows automatic transfer of transactions, automatic or manual production of invoices and instant account updates. Estimates can be divided into sections, MJC invoices can be separate from those generated by MDS and job progress reports can be produced at any time.

MJC: \$500.
*Micronet Systems,
P.O. Box 467,
Wollongong East NSW 2500
(042) 27 1666*

NEW PRODUCTS

New LAN package

Orion has obtained the Australian distribution rights for the Arcnet local area network (LAN) package produced in Canada by Inetco Systems.

Arcnet at present is supported under the Inetco Coherent UNIX compatible operating system but will soon be released under XENIX, MS-DOS and PC-DOS. It was designed for use on intelligent co-processor cards. It can run on the Persyst/Emulex DCP-88/VM communication card attached to an IBM PC, AT, XT or compatible. Arcnet is a token-passing network that overcomes the problem of information "collisions".

The package costs \$225.

*Orion,
4 Kenilworth Street,
Bondi Junction NSW 2022
(02) 387 2583*

Hand-held PC

Discware has released the first hand-held IBM compatible microcomputer, the Datacomputer.

The unit is intended for people who need to collect data, calculate and exchange information with a host computer. The one kilo Datacomputer's features include its design, MS-DOS compatibility, ease and versatility in programming task-specific software, its upgradability with plug-in memory boards and its ability to acquire data, using either a high speed keyboard or a bar-code pen.

It can be used as a passive data collection terminal or as a self-contained interactive microcomputer. The unit has an alphanumeric keyboard, a battery power supply and plug-in RAM boards for up to 256K of memory. Equipped with an RS232 port, it can transmit data

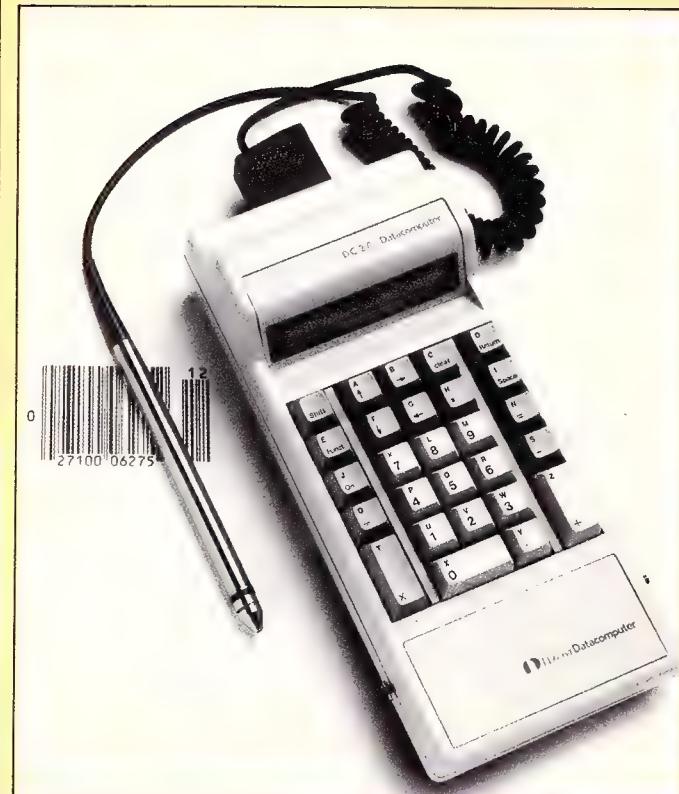
via a Hayes compatible modem or cable.

The Datacomputer can run applications software developed on an IBM PC or compatible under MS-DOS. Programmers can write applications in familiar languages and download it to the unit.

It is also provided with pro-

gramming utilities on disk, including keyboard and display routines, bar-code decoder programs, and modem and printer drivers.

*Discware,
5th floor, 3 Small Street,
Broadway NSW 2007
(02) 212 6933*



Discware's hand held PC: a high speed keyboard or a bar-code pen.

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BMS release Lotus clone

Business Model Systems has released Boeing Calc, an upgraded Lotus clone aimed at corporate Lotus users with sophisticated applications and users with spreadsheets that need to be bigger than those allowed by Lotus 1-2-3.

With Boeing Calc, calculations referencing cells on different spreadsheets can be made as easily as those on a single spreadsheet. This makes consolidation of unlike spreadsheets simple and reduces the time needed to build more sophisticated models. Spreadsheets can be 16,000 rows by 16,000 columns with 16,000 interconnected spreadsheets.

The package is hard disk bas-

ed, allowing spreadsheets of up to 32M to be built with only 384K main memory. No add-on memory is required for larger spreadsheets. Boeing Calc is fully compatible with Lotus 1-2-3. Lotus users require no retraining and existing Lotus models run in Boeing Calc without conversion.

It was developed by the Boeing Aircraft Corporation for its own use to overcome limitations experienced with conventional spreadsheet systems. Its recommended retail price is \$895.

*Business Model Systems,
83-87 Wellington Street,
Windsor VIC 3181.
(03) 51 1572*

Speed and AT compatibility

The SNS Group has released an enhanced AT compatible called the Leading Edge Express, designed with small to medium-sized businesses in mind.

Each machine has 640K of RAM as standard, a 30M Seagate hard disk drive and clock speed of 8MHz. SNS claims the Leading Edge Express was designed as a quality package for users wanting the speed of the IBM PC/AT at half the price and to compete with other AT-compatibles.

*The SNS Group,
2-3 The Postern,
Castlecrag NSW 2068
(02) 958 2399*



The Leading Edge Express: compatible with most software designed for the AT.

Access opens on LAN

Software Suppliers has launched a Local Area Network version of Open Access II. One of the features of the networking version is its "record sharing" facility. This maintains the data integrity of information in cases where multiple users need to access the same database record and ensures that the record is accessed by only one operator at a time.

The LAN version also has a security system that restricts access to confidential information and a multi-user spreadsheet capability. It is available as a

High speed mass storage

The StreamLiner SL-60 series of high speed mass data storage and tape back-up units have been released by Alloy Australia. The units have either 20M or 40M hard disk drives in a self-contained cabinet with a 60M tape cartridge drive for back-up.

The TIPTOK utility allows file back-ups to be done automatically at any time and completely unattended and can be used for other computing activity that is time consuming. The units are directly connectable to the IBM PC, XT and compatibles with external controller ports, and can be added to IBM ATs and other compatibles using Alloy's FTFA interface card.

The price for the 20M model SL-60/25 is \$4580, while the 40M SL-60/51, with tape cartridge sub-system, is \$6080.

*Alloy Australia,
318-322 Stephensons Road,
Mount Waverley VIC 3149
(03) 277 1333*



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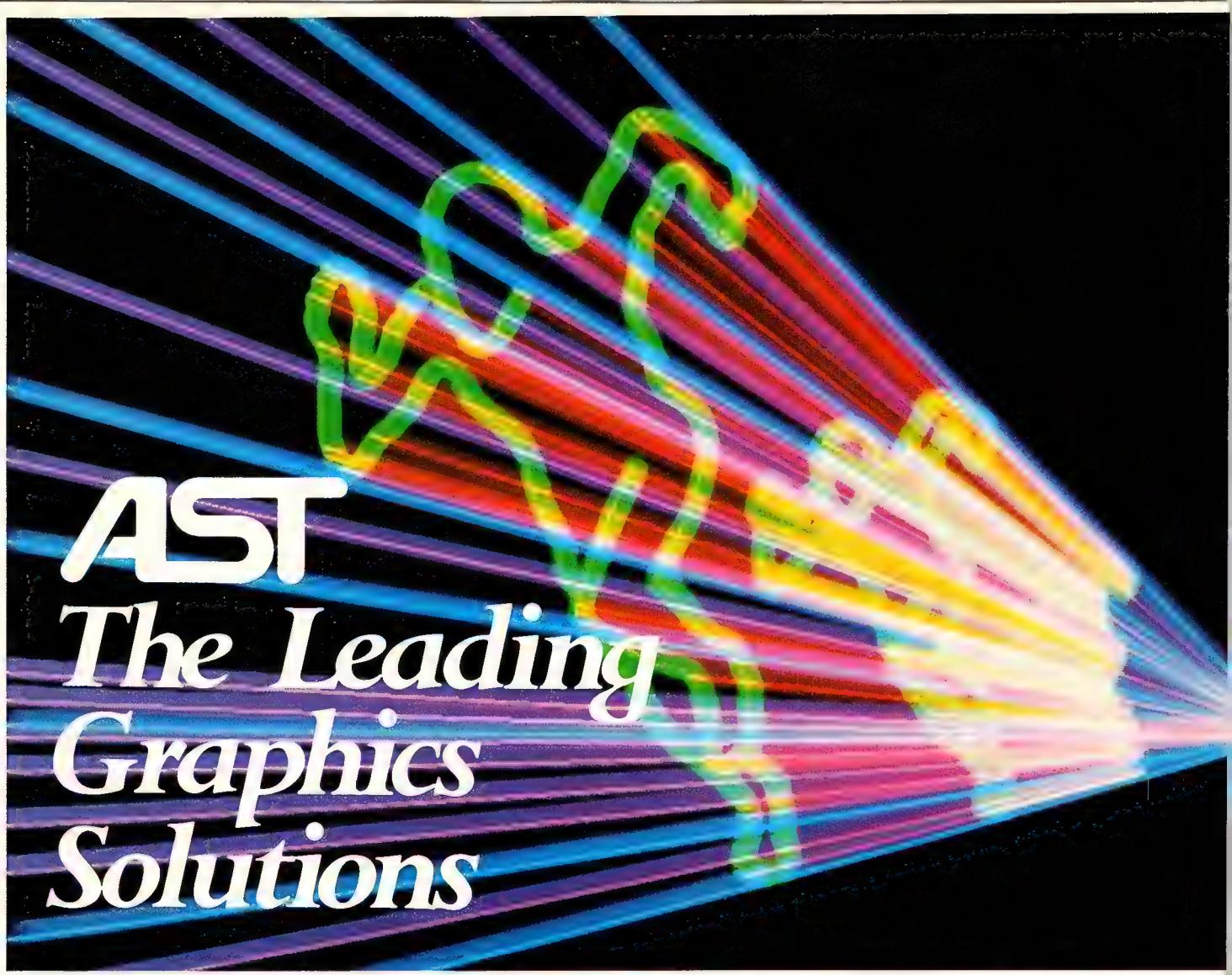
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total product, but each module can be obtained in any quantity and used with a single file server.

The modules are a relational database (containing Programmer, a programming language), a spreadsheet with three dimensional graphics, a word processor, a communications option, a desk manager (included in all modules) and an electronic message facility.

*Software Suppliers,
7 Avon Road,
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AST

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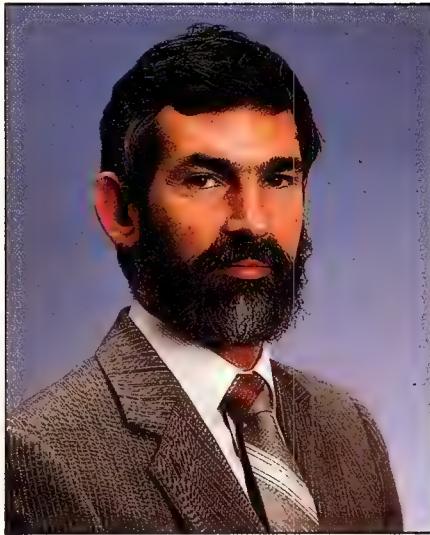
Ground Flr, 51-53 Park Street, South Melbourne, Vic. 3205. Telephone: (03) 699 9022

3/249 Coronation Drive, Milton, Qld. 4064.

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86 Wairau Road, Takapuna, N.Z. Telephone: (09) 444 5088

Step through ranges



If you have any hints, tips or patches which you would like to pass on send them to: Spreadsheet Clinic, PC Australia 4th Floor, 392 Little Collins St., Melbourne Vic 3000. Authors of published items will receive a complimentary box of diskettes.

Range names in Lotus Release 1A

Unless you have Lotus 1-2-3 Release 2, it is difficult to get a list range names used in the worksheet. The following macro may assist. It simply "steps" through all the range names, indicating the areas named. The "stepping" is done with the "Enter" key, and one can exit from the routine by entering an illegal address, then "Esc." The routine uses the Range-Name command and uses the pointer to go "right" through the names. It does this by copying the "/xr" command down and inserting another "right" above it.

One important point is that you must have enough room in that column to allow sufficient "right" entries.

To run the routine, first do "Alt"n, then keep hitting "Return" to step through the names. When you have looked at sufficient names, enter an illegal address such as "zzzzz", then "Enter", then "Esc".

George Briansky
North Balgowlah, NSW.

\N	{ goto } DORIGHT ~ { down } /re { end } { down } ~
FIND	/rndENDDO ~ /rncENDDO ~ ~
	/cSLXR ~ ~
	/cDORIGHT ~ ~
	{ goto } ENDDO ~ /m ~ { down } ~
	/cC__RIGHT ~ ~
	/xgFIND ~
SLXR	~ { ? } ~ /xr
C__RIGHT	{ right }
DORIGHT	/rnc
ENDDO	DUMMY
	DUMMY

Figure 1: Moving through range names

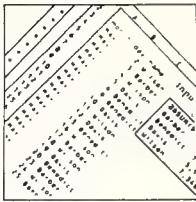
This application is an interesting example of a self-modifying macro. I have taken the liberty of changing the range name RIGHT, as originally supplied, to C__RIGHT (cursor right) (see figure 1). As Briansky points out, the macro would be unnecessary under Release 2 of 1-2-3 or Symphony which both have the Range Name Table command and the ability to display range name definitions while in the Range Name Create command (by pressing F3 in 1-2-3 or F10 in Symphony). However, the use of Range Names which correspond to special keywords or commands leads to confusion in the latter products. This is because they let you call a subroutine by putting the range name of the subroutine in braces, leading to confusion as to the meaning of {RIGHT} in this case. The situation is more than just confusing in Symphony since a subroutine call takes precedence over a special command word. Thus, {RIGHT} would become a subroutine call, — in this case, one which called itself with the result that after calling itself 32 times the maximum nesting level would be exceeded and the error would stop the macro. As a general rule, Range Names which correspond to any of the command or key words in 1-2-3 Release 2 or Symphony should be avoided.

Unworkable worksheets

I have been using 1-2-3 for the past 18 months and have created a large number of spreadsheets. It didn't take me long to generate a list of worksheets on my hard disk that was too large to be workable. Since most of my work is project related, it made good sense to keep one sub-directory for each project's data. However, it became quite tedious to continually get into 1-2-3 and go through the process of setting up the correct directory for the required project. I overcame this problem using the batch-file facility of the PC. Assuming that 1-2-3 is found on C:\LOTUS, for the first time enter C:\LOTUS and Copy 123.cnf to std 123.cnf and Copy graph.cnf to stdgraph.cnf (see over page).

By typing "name" in your directory C:\LOTUS you enter LOTUS and can create and alter a specific number of worksheets in the directory C:\LOTUS\name, rather than all worksheets in the directory C:\LOTUS. It also saves you having to keep track of a large number of floppy disks.

I hope this is considered useful. Enhancements can be made by locating the batch-file which drives the system in a directory to which there is a path and having it change directories. For some of my applications I also have the batch-file access 1-2-3 and



PRINTGRAPH directly, bypassing the main LOTUS menu altogether and giving much faster access.

P. Fowler
Seacliff Park, S.A.

I have set up a macro with a menu to change subdirectories within 1-2-3, but your solution also takes care of the Printgraph settings which cannot be done in a macro.

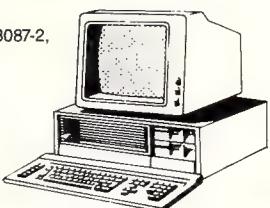
1. MD name (where name is the project-name and is less than 7 characters long.)
2. Enter LOTUS, then 1-2-3 and change the worksheet directory with /WGDD to C:\LOTUS\name.
3. Save the 1-2-3 configuration with /WGDU.
4. Exit from 1-2-3 and enter PRINTGRAPH.
5. Alter the default PRINTGRAPH settings with CFP to C:\LOTUS\name.
6. Save the new configuration file for printgraph using the CS option.
7. Quit PRINTGRAPH and EXIT LOTUS.
8. Copy 123.cnf Lname.cnf
9. Copy graph.cnf Gname.cnf
10. Create a batch-file called NAME.BAT — with the following:

```
COPY LNAME.CNF 123.CNF
COPY GNAME.CNF GRAPH.CNF
LOTUS
```

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John Waugh
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File and combine

I have struck an unusual problem with Lotus 1A concerning the file transfer and combine features. I use the File Combine Add menus to update the progressives in a cost report worksheet. The file occupies 270K of RAM and 213K of disk space on an IBM XT with 10M disk and 640K of RAM. To update the progressives a macro first calculates the file and then saves it. Next it {File Combine Adds} a range from the disk copy of the worksheet to a location in the RAM copy. That is when I strike the "Worksheet Full" error message.

One would like to believe it has been caused by Lotus loading the disk copy back into memory to extract the range to combine and as the file is so large it cannot support two copies in memory, thus the "Worksheet Full" error. That sounds logical but the worksheet was first developed on a twin floppy Logitech with only 512K and it worked quite successfully, if somewhat slow. It appears that Lotus 1A and IBM XT's do not agree on file combines.

The conclusion I have drawn is Lotus 1A will file combine large worksheets when using the system disk in drive A: but will not when Lotus is run from a hard disk, it appears not to matter if the computer is booted from floppy or hard disk, but Lotus must be run from drive A: if the file combine is to work with large files. Therefore the XT with only one drive cannot file combine large worksheets.

Brett E. Russell
Ulverstone, Tas.

This sounds like a classic case of 1A v 1A. Although Lotus did not publicise the fact, the bug you describe was present in the initial release of 1-2-3 1A and was caused by 1-2-3 checking that the entire spreadsheet on disk could fit into RAM instead of just the Named Range. This was fixed very quietly and the updated product is only distinguished in appearance by an asterisk which appears on the opening copyright notice, underneath the version indicator. Accordingly, it is referred to as 1A*. I would be willing to bet that you have been alternating between the two versions, loading from the hard disk and the floppy. I have been aware of some cases of 1A being supplied instead of 1A* right up to the change over to Release 2.*

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SM891	SmartModem 21/23SA	AD, AA, AX, AT, SY/ASY, AR	300 FDX, 1200/75 FDX, 1200 HDX (V21, V23, Bell 103)
SM870	SmartModem 1200A	AD, AA, AX, AT, ASY, AR	1200 FDX, 300 FDX (V22, Bell 212A, Bell 103)
SM872	SmartModem 1200SA	AD, AA, AX, AT, SY/ASY, AR	1200 FDX, 300 FDX (V22, Bell 212A, Bell 103)
SM880	SmartModem 2400A	AD, AA, AX, AT, ASY, AR	2400 FDX, 1200 FDX, 300 FDX (V22bis, V22, Bell 212A, Bell 103)
SM882	SmartModem 2400SA	AD, AA, AX, AT, SY/ASY, AR	2400 FDX, 1200 FDX, 300 FDX (V22bis, V22, Bell 212A, Bell 103)
SM840	SmartModem 123A	AD, AA, AX, AT, AR, ASY	1200 FDX, 1200/75 FDX, 300 FDX (V22, V23, V21, Bell 212A, Bell 103)
SM842	SmartModem 123SA	AD, AA, AX, AT, AR, SY/ASY	1200 FDX, 1200/75 FDX, 300 FDX (V22, V23, V21, Bell 212A, Bell 103)
SM845	SmartModem 1234A	AD, AA, AX, AT, AR, ASY	2400 FDX, 1200 FDX, 1200/75 FDX, 300 FDX (V22bis, V22, V23, V21, Bell 212A, Bell 103)
SM847	SmartModem 1234SA	AD, AA, AX, AT, AR, SY/ASY	2400 FDX, 1200 FDX, 1200/75 FDX, 300 FDX (V22bis, V22, V23, V21, Bell 212A, Bell 103)
IN600	PC In/Modem	FI, AD, AA, AX, AT, ASY, AR	300 FDX, 1200/75 FDX (V21, V23, Bell 103)
IN610	1200 In/Modem	FI, AD, AA, AX, AT, ASY, AR	1200 FDX, 300 FDX (V22, Bell 103)
IN615	2400 In/Modem	FI, AD, AA, AX, AT, ASY, AR	2400 FDX, 1200 FDX, 300 FDX (V22bis, V22, Bell 212A, Bell 103)
IN620	123 In/Modem	FI, AD, AA, AX, AT, AR, ASY	1200 FDX, 1200/75 FDX, 300 FDX (V22, V23, V21, Bell 212A, Bell 103)
IN625	1234 In/Modem	FI, AD, AA, AX, AT, AR, ASY	2400 FDX, 1200 FDX, 1200/75 FDX, 300 FDX (V22bis, V22, V23, V21, Bell 212A, Bell 103)
TR100	TrailBlazer	18,000 bps Pocketised Ensemble Modem; AD, AA, AX, AT, AR, ASY, EC, 2 wire PSTN	High Speed, 2400 FDX, 1200 FDX, 300 FDX (Adaptive Duplex, Bell 212A, Bell 103, V22, V22bis)
TR200	TrailBlazer PC	FI, as above	As above

LEGEND:

MD — Manual Dial AR — Auto Ranging ASY — Asynchronous
MA — Manual Answer AA — Auto Answer SY/ASY — Synchronous/Asynchronous
PD — Pulse Dial AX — Auto Disconnect FI — Fully internal modem for
AD — Auto Dial AT — "AT" Command Set IBM PC or Compatible



Bulletin board

PC User Groups

MELB-PC
 Contact: Lloyd Borrett (03) 529 2333
 Time: 6.00pm first Wednesday
 Venue: Clunies Ross House
 191 Royal Parade
 Melbourne

Sydney PC User Group
 Contact: Catherine Rosenbauer
 Time: (02) 29 7033
 Venue: 5.45pm third Monday
 Esso Auditorium
 35 Clarence Street
 Sydney

Perth PC Micro Users Group
 Contact: Peter Goodwin (09) 274 5911
 Time: 5.30pm first Tuesday
 Venue: Royal Kings Park Tennis Club
 Kings Park Road, West Perth

Adelaide PC Users Group
 Contact: John Roberts (08) 212 5020
 Time: 7.45pm second Thursday
 Venue: 195 Gilles Street

PC Users Group Inc. (ACT)
 Contact: Chess Krawczyk (062) 80 5954
 Time: 8.00pm final Monday
 Venue: Coombes Lecture Theatre
 Australian National University

Brisbane 16-Bit Users Group (BRISBUG)
 Contact: Roy Willie (07) 393 3388
 Time: 2.00pm third Sunday
 Venue: Toowong State High School
 Bywong Street, Toowong

Central Coast PC User Group
 Contact: John Caine (043) 69 1052
 Time: 8.30pm second Wednesday
 Venue: Central Coast Grammar School, The
 Entrance Road, Erina Heights

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 Dick Smith IBBS

South Australia (08) 271 2043
 Adelaide User Group (07) 52 9498

Queensland (09) 227 9229
 Competron

Western Australia Perth PC Users BBS

APPLICATIONS SOFTWARE USER GROUPS

Multiplan Users Group: Address: PO Box 95, Forestville, NSW 2087. Contact: Richard Womack (02) 997 1554. Meetings: 6.15pm 2nd Wednesday, City Personal Computing, 55 York St, Sydney.

Sydney dBase Users Group (includes Framework SIG): Address: ACS, 72 Pitt St, Sydney 2000 Contact: Catherine Rosenbauer (02) 74 1961 Meetings: 6.30pm 3rd Tuesday, ACS, 1st Floor, 72 Pitt St, Sydney

Spellbinder User Group: Contact: Kathie Hanson Meetings: 6.00pm fourth Monday, Room 9, Trades Hall, Cnr Dixson and Goulburn Sts, Haymarket, NSW 2000.

Forth Interest Group: Contact: Lance Collins (03) 29 2600, PO Box 103, Camberwell 3124. Meetings: 1st Friday, 8.00pm, Bowen St Family Centre, 102 Bowen St, South Camberwell.

Brisbane dBase Users Group: Contact: Alan Scott (07) 221 9122 Address: PO Box 1463 Brisbane. Meetings: 5.30pm 2nd Wednesday 6th Floor, 307, Queens St, Brisbane

APL User Group: Address: IP Shop offices 8th Floor, 53, Elizabeth St, Sydney Contact: Laurie Gellatly (02) 232 6366 Meetings: 5.30pm, 3rd Wednesday

Notice

If you have any further
PC community information for this
bulletin, contact Ian
Robinson (03) 602 4122 or
Margaret Macrae (02) 235 6617.

SPECIAL INTEREST GROUPS

The PC User Group in Sydney has spawned a number of special interest groups (SIGs) which meet at varying times throughout the month.

ComSIG — 5.45pm second Monday, ACS, 1st Floor, 72 Pitt St. Contact Geoff May (02) 699 3518.

BusinessSIG — 5.45pm fourth Tuesday, Peat Marwick, 31st Floor Australia Square, Pitt St. (02) 29 8685.

CHUSIG (Challenger PCs) — 5.45pm 2nd Tuesday, 4th Floor, 80 Arthur St, North Sydney. contact Geoff Townes.

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Address: PO Box 81
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Contact: Ron Savage (03) 651 1414
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Church, cnr Canterbury Rd/Burke Rd,
Camberwell

Western Australia

Address: 2/294 Rokeby Road,
Subiaco WA 6008
Contact: Frank Reynolds (09) 382 2692
Meetings: 7.30pm 2nd Tuesday
University of Western Australia Room G3
Electrical Engineering Building

Lotus User Groups

Melbourne

Contact: Robert Taylor (03) 267 4800
Time: 5.30pm first Tuesday
Venue: Light Car Club, 46 Queens Rd

Sydney

Contact: Ron Pollak (02) 290 3655
Time: 5.45pm first Thursday
Venue: National Australia Bank House,
12th Floor, 255 George St

Perth

Contact: Peter Foreman (09) 322 5589
Time: 5.30pm second Wednesday
Venue: KMG Hungerfords, 9th Floor,
190 St George's Tce

Adelaide

Contact: Paul Wragg (08) 223 5711
Time: 7.30pm first Tuesday
Venue: 164 Fulerton Rd, Dulwich 5065

Brisbane

Contact: Bill Savage (07) 221 2144
Time: 5.30pm first Tuesday
Venue: MLC Centre, 28th Floor,
230 George St

Newcastle

Contact: Louis Lee (049) 26 8692
Time: 5.35pm first Thursday
Venue: Newcastle Gas Company, 623 Hunter St

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Four colors restore faith

You may remember me complaining some time ago (in fact it was in November last year) about the lack of decent games on Viatel and the insultingly trivial examples which existed. Unfortunately the situation has not changed much since then, although several of the more ridiculous offerings have sensibly been trashed; the rental charges for the unused frames were obviously starting to hurt the providers.

However, every now and then my faith is restored by the appearance of a game which requires a little bit more than luck and persistence to solve. The most recent example of this is Dynagrid on page *45560# (off the Astra Games menu). Dynagrid is the first game I have seen which makes use of the Prestel screen addressing codes to update the frame image as play progresses.

Dynagrid is based on a rectangular playing area which is divided into a number of smaller areas, and will be familiar to those who studied the famous Four-Color Theorem at school. The aim is to color in each of the areas with one of four colors, without any area touching another area of the same

color. Dynagrid stands out as one of the few Viatel games where you actually have to strain your brain (albeit only moderately) to compete successfully.

I would imagine Astra Games picks up a good deal of its income from Dynagrid, as each guess at a new color costs four cents and the player can easily forget about the bill he or she is running up, mainly because the frame does not change dramatically each time. Successful completion of a puzzle allows the player to send in a response frame and be in the running for a \$20 prize; big deal!

Another new game concept which has caught my interest is the multi-player Great Galactic Conflict, operating under the Microtex 666 node. To quote the initial promotional gush, the organisers hope to sign up no less than "one thousand cheating, conniving and ruthless warlords", who may choose to play individually or in organised groups (communicating by electronic mail of course) in a bid to control the entire videotex galaxy.

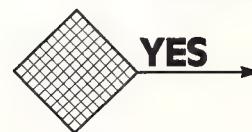
In the case of the Great Galactic Conflict, the bulk of the money comes from the initial registration (\$22.50 a player), although additional revenue is

picked up from charges on electronic mail messages between players. In this case the prize money for the winner is \$2500 and other prizes available total several thousand dollars.

I noticed an interesting payment technique when signing up for this intergalactic extravaganza and that was the option of paying for entry by frame charges instead of the usual process of quoting a credit card number. This method is being used increasingly by many service providers and is ideally suited to low-cost activities such as this. Credit card payment involves paperwork, cross-checking and an inherent time delay, although it is in many ways a safer method of payment.

To pay the \$22.50 registration fee for the Great Galactic Conflict, you have the option of stepping through five pages with the extortionate frame charge of \$4.50 each (remember that the maximum frame charge is \$4.99), to end up at a response frame which immediately registers you as a paid-up 'warlord'. The fee, of course, ends up simply buried away in your phone bill, so the purchase is a great deal harder to check up on later and is impossible to cancel; — *caveat emptor!*

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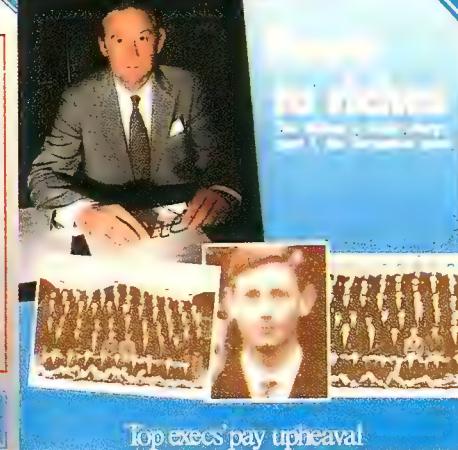
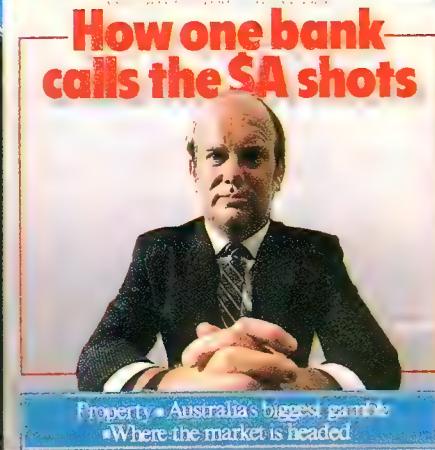
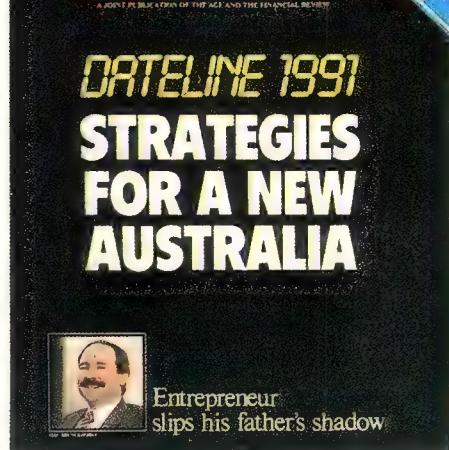
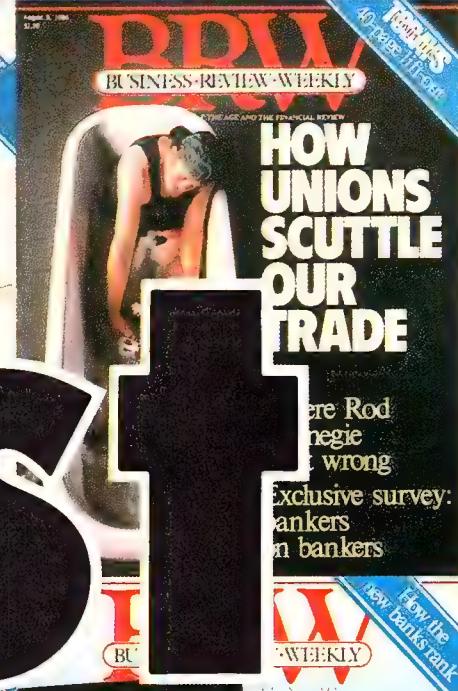
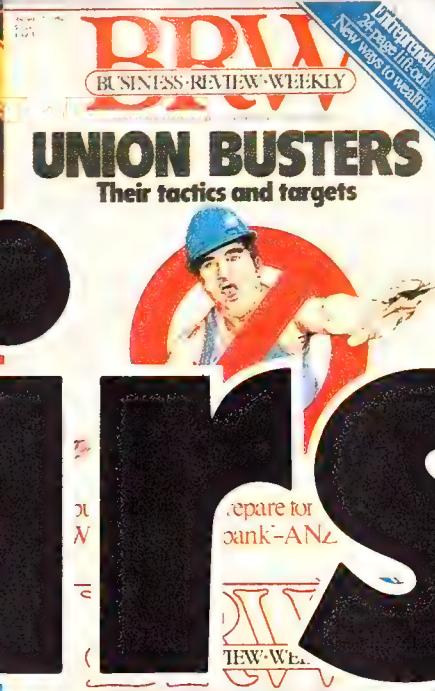
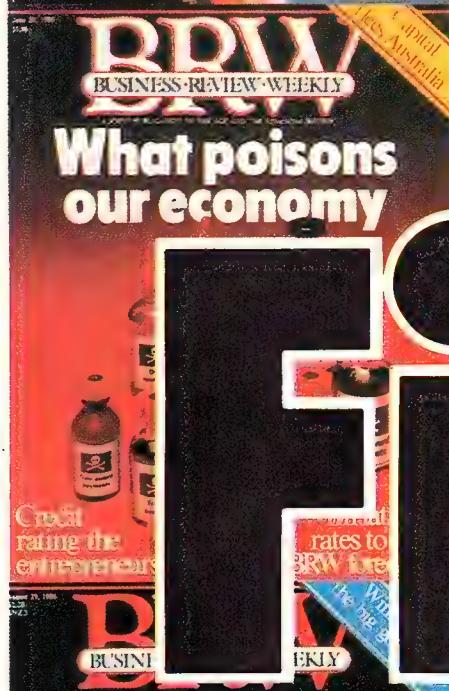
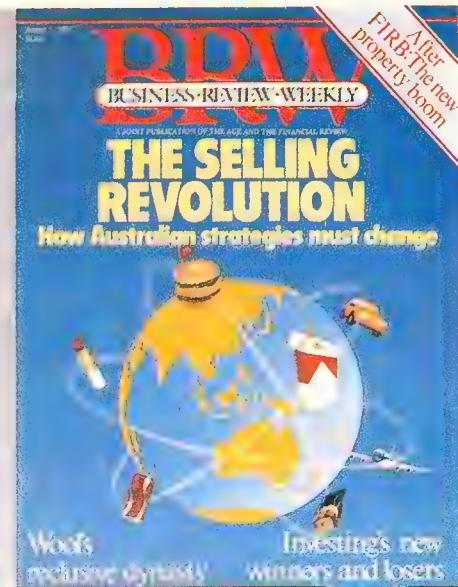
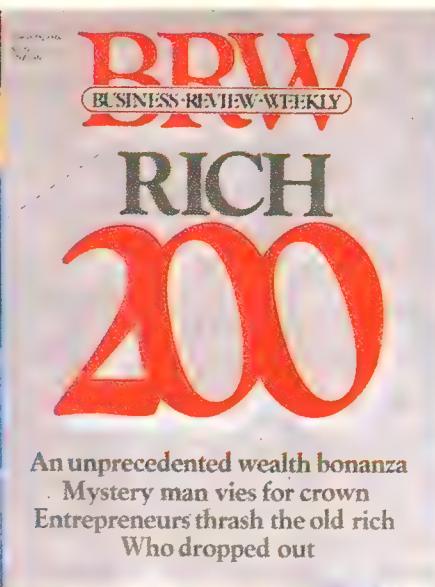
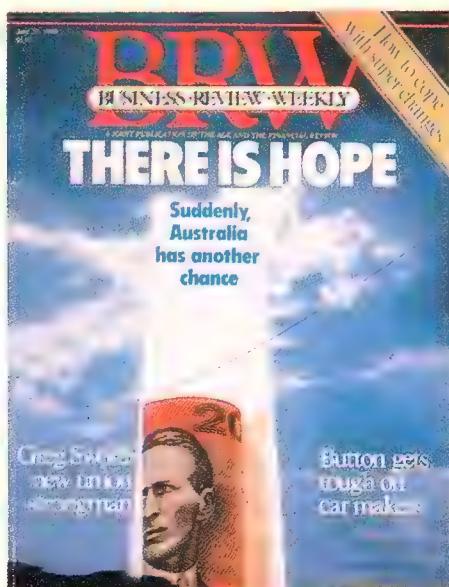
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THE FIRST CHOICE FOR BUSINESS

A dynamic step



Last month, one of the most significant events in the history of microcomputing took place. Microsoft announced the purchase of Dynamical Systems.

Dynamical is the company that developed Mondrian, a **TopView clone** that supposedly runs rings around TopView and takes up two-thirds less memory. I saw it some time ago and it was hot, even though TopView was not. Professors and **wizards** coded the thing. With zero marketing experience or expertise, Dynamical figured that it would market it to OEMs (original equipment manufacturers). It figured **wrong**. TopView itself never took off and Dynamical's OEM strategy failed. The product should have been marketed directly to end users.

Be that as it may, the product represented a **threat** to both TopView and Windows. Supposedly, Dynamical had tried to sell Mondrian to IBM, but I was told that "they were talking to the wrong guys." Maybe not.

It is entirely possible that IBM would rather do business with a company like Microsoft than with a bunch of guys working in an Oakland attic (where the coders **slaved away**). On the other hand, it may just be that there's more to this deal than meets the eye.

Here is the scenario: Microsoft bought out Dynamical for a song. "Nobody got rich on this deal," I was told by one source. "They got a lot less than you can

imagine," said another. Nobody knows exactly what Microsoft paid for the company, but it seems to be something like \$US200,000 and some stock options. Microsoft also gave eight programmers lifetime jobs (how noble of it). Meanwhile, unstated in the press release and unknown to Dynamical is the **real possibility that IBM will end up with the code** and that Microsoft will clean up in royalties.

Here is where this sale fits into the overall scheme of things. Microcomputer manufacturers are trying to **standardise an 80386 machine** to do an end run on IBM. Phoenix Software is leading this group with support from companies like Compaq, which should have supported (or bought) Dynamical when it had the chance. IBM does not want to see an early use of the 80386, however, because it will impinge on its profitable System 36/System 38 business. Instead, IBM wants to **milk the 80286** for all it is worth for as long as possible. At the same time, IBM wants to cut off some of the clone makers from taking too big a slice of the IBM pie. Finally, IBM surely does not want to see the marketplace **confused** by an 80386 machine designed by a committee.

So, IBM plans to release PC-DOS 5.0 earlier than expected. Version 5.0 is said to be **hotter than hot. It will feature true multitasking**. IBM hopes to make the 286 so attractive that there will be no early interest in 386-based computers. It

would very much like this move to breathe years of life into the PC AT generation.

According to gossipmongers, there will not be an OEM version of DOS 5.0, and somehow **TopView will be part of the system — maybe in ROM**. As it now stands, the IBM version of TopView is simply too massive to put into ROM cheaply. So here comes Microsoft with its version of TopView which is decked out and **ready to ROM**. The end user will never know the difference. Let us call it TopView 3.0 or some such nonsense. Meanwhile, let us guess which 80386 machines will be **out of luck** in the compatibility game.

Even if IBM does not want Mondrian, Microsoft can put it into a Windows interface and sell it to Compaq, Hewlett-Packard, Wang and some of the other also-rans.

Then again, perhaps Microsoft can make itself a **sweet deal** with Godfather Big Blue to quietly remove Mondrian from the market, leaving **no TopView clones for anyone**. Get the picture?

In addition to all these machinations, I am told that IBM has **truckloads of TopView-specific software** ready to roll when it announces the new operating system and new ROMs. This all should take place before the end of the year. We will see.

Meanwhile, I do not like the look of any of it. ■



Coming up

Artificial intelligence is something we have all heard about, but how can it benefit PC users? Few AI packages are available but it is often claimed that their widespread acceptance in the future will revolutionise the way we use PCs. In November senior writer Les Stein reviews Guru, a monstrous AI package from MDBS — the creators of the KnowledgeGuru database.

In addition, all of our regular columnists will be back once again, including **Stephen Murray, John Green, Robin Howells, Clive Lassiter and Vi Adelle**. If you are new to PC Australia and picked up this issue from the news-stand, why not fill in the enclosed subscription card right now, to make sure you do not miss out?

Hong Kong hustle



In Hong Kong, when the going gets tough, the tough go selling. How else do you explain thousands of closet-sized shops lined up, row upon row, flogging third-rate Walkmans? Selling is a way of life, not just a business, so it is no big deal to see illegal copies of Lotus 1-2-3 sold next to the lychees stand.

Yes, there are sweatshops of hungry peasants sticking phony Apples together. It is true that you can buy a floppy disk (and I mean floppy!) of the latest and greatest for the cost of a rickshaw ride and change.

But does all this really represent a threat to the pulsating heart of capitalism? Must Lotus and Apple patrol the back alleys of Asia to protect their livelihood?

The director of the Asia Computer Plaza, the legitimate nub of techie wares in Kowloon, told me that only a small percentage of software needs are fulfilled in the alleys. No viable business will shop in software sewers.

On one of those steaming Hong Kong summer days with my clothes sticking fast, I headed off to examine the infamous Golden Centre.

Inside was a labyrinth of more than a hundred little shops, half of which sold Apple II relics such as 80-column cards, fans and joysticks. Mingled among this junk were serious heavy duty fraud shops full of IBM software. Each disk was about \$HK 30, about

\$A5. It goes by the disk, not the program. AutoCAD disks cost the same as Frogger. Manuals printed on crumbling paper, interspersed with upside-down pages, were available for another \$5.

Questions about pirating techniques were totally unacknowledged; not even a look or pause to indicate they had heard. I was about to abandon any serious investigation when a burly German stepped up and asked for Pro/Tem's Footnote program for WordStar. All of a sudden there were shouts and yells and a boy broke from the crowd and dashed off somewhere. Minutes later he returned clutching the program and a copy of the manual high above his head.

That boy, I thought, must be running to the source and I resolved to follow him when next he bolted. I tried to get him going by asking for all sorts of exotic software but it was either in their massive collections or they never heard of it. As I was about to leave this shop, another German asked for Xy Write. He wisely insisted on a demonstration of the program and his eyes rolled up in horror when he realised that they were trying to sell him an outdated version. He started pounding on the counter when, suddenly, the room froze and all eyes turned to the boy who again shot off.

This time I was ready. I leaped behind him as he darted out the door. He went about four steps, paused and then dashed into an adjacent store which looked no different from the rest. The boy shrieked something in Chinese, which, as far as I could tell, did not contain the word XyWrite. The proprietor opened a massive box of floppies and pulled out the latest version.

In a corner where the fluorescent lights had gone dark, I found a wild-looking Englishman hunched over a PC clone who said he would be glad to talk. He sent out for some tea and I sat in the airless room, dripping buckets as he related to me how it works. Most of the vendors are independent but will supply copies to other vendors at a discount. One or two central suppliers

go to the US or buy software from mail order houses. Vendors mostly buy from others in the centre although the larger ones buy from the source.

I asked if I could meet one of the sources, having images of a slick Mercedes and brutal bodyguards wearing shades. He leaned over with his face about a foot from mine and said "You're looking at one of them." An unlikely magnate, an unpretentious crook. Anyway, that is what he led me to believe and, if in the end, he was merely displaying that obtuse English humor which leaves me cold, I cannot tell.

After postulating various gradations of ethical propositions, he summed up with these justifications. With multiple programs which make competing claims, pirateware is an easy way to assess preferences. He also asserted that the buyers who frequent the Golden Centre are the kind who will scavenge anyway; this just turns their poor character into a bit of profit for the otherwise unemployed. Finally, he argued that vendors have to buy 'legit' copies in the first place and at the low selling price of illegal copies, the money is rarely recouped.

He felt, with the moral power of a religious fanatic, that he was doing nothing wrong. The condemnation, he believed, should be laid at the feet of software developers who charged a mint for a bug-ridden product and then asked more for bug-fix upgrades.

As convoluted as his moral imperative may seem, it was clear to me that such a point of view will mean that no amount of enforcement will fully stop illegal softwares sales in Hong Kong. This view, which is shared by others, means that illegal copying goes beyond a quick buck and is almost part of a political statement.

I do not want to make his justifications work too hard, but I was left uneasy as to the ramifications. Asian pirating is growing and discreet advertisements are beginning to appear in US computer magazines. If software prices continue to climb, Asian pirated software may become the biggest computer growth industry.

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